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# WILLOWS OF MONTANA



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U.S. Department of the Interior  
Bureau of Land Management  
Montana State Office  
Billings, Montana



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## BUREAU OF LAND MANAGEMENT

Montana State Office

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Billings, Montana 59107-6800

IN REPLY TO:

6840 (931)

November 23, 1992

Dear Colleague:

Enclosed is a copy of the Third Approximation of "Willows of Montana." Please take note of the errata sheet. I intend to bring out the final product in the fall of 1993. Please utilize the book in the spring and summer of 1993 and submit your criticisms to me at:

Don Heinze  
BLM Montana State Office  
P.O. Box 36800  
Billings, MT 59107

I will incorporate the necessary changes into the final product and also have the line drawings improved.

Sincerely,

Donald H. Heinze  
Botanist

1 Enclosure

1—"Willows of Montana"

— 1 —

• 8 ( 1 )

2. *Phragmites* (Phragmites) *australis* (L.) Trin. ex Stev. *Phragmites* *australis* (L.) Trin. ex Stev.

the author's name, and the date of the manuscript. The original

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3. *Experiments on the effect of temperature on the rate of absorption of oxygen by the blood.*

CC 926

## **ERRATA**

Page 5, last sentence, capitalize Avens and Cinquefoil.

Page 8-9, Maps are reversed.

Page 29, Drawings courtesy of University of Washington Press and New York Botanical Garden.

Page 31, Drawing courtesy of New York Botanical Garden.

Page 32, Drawing courtesy of University of Washington Press.

Page 33, Drawing courtesy of New York Botanical Garden.

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Page 54, Drawing courtesy of University of Washington Press.

Page 56, Also found in Bighorn County.

Page 66, Drawing courtesy of University of Washington Press.



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Montana Willows  
(A Third Approximation)  
Riparian Technical Bulletin No. 2

1992

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The help and support for this project from the Montana/Wyoming Botanical Community has been very gratifying. Special acknowledgment must go to Robert Dorn, Mountain West Environmental Services; and Peter Lesica, Lesica Ecological Services. They epitomize the concept of gentlemen and scholars. Other people who were instrumental in making the project possible are Steve Chadde, U.S. Forest Service; Robert Allen, artist, BLM; Janie Fox, typist, BLM; Mary Lou Mayes, cartographic technician, BLM; Paul Hansen, Montana Riparian Association; Sandy Brooks, range conservationist, BLM; and John Moorhouse, Chief, Branch of Biological Resources, BLM.

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# Introduction

Willows, the genus *Salix*, are intimidating. The genus is very large, complex, and variable, which makes determining species extremely difficult under most circumstances. We, however, have entered an era of sophisticated riparian management where it is no longer permissible to write “*Salix* sp.” and go on whenever a willow is encountered. The purpose of this technical bulletin is to aid the field person in making expedient, accurate identification of species of the genus. It is assumed that the user of the bulletin has had at least one college course in plant taxonomy; we do not recommend that others attempt to use it.

We have identified several problems regarding identification of willow species and have attempted to solve them. These are:

1. Problem: The size of the genus. Dorn (1984) lists 34 species (33 of which are native) that may occur naturally in the state. In addition, there are three more exotic species which *may* escape or otherwise may have riparian significance.

Offered Solution: We have divided Montana into five ecological zones: Plains, Foothills/Valley, Montane, Subalpine, and Alpine (see map). Descriptions of these zones follow this introduction. With his permission, we have then divided Robert Dorn’s Willow Key (1984) into five parts, one for each of the five ecological zones. Therefore, someone working on the plains will not have to deal with plants that are found in the mountains; he/she can go directly to the pertinent key.

2. Problem: Overlap. A given species may occur in two or more ecological zones.

Offered Solution: We have placed species which occur in several zones into several keys; i.e., the zones pertinent to that species. This does tend to reduce the effectiveness of dividing the species into zones, but still all zone keys are at least 50 percent smaller than the original key (17 species v. 37 in the case of the largest zone key).

3. Problem: Size of narrative. Most works on willows are, of necessity, very extensive.

Offered Solution: Put text in tabular form. This also makes the descriptions of various structures (leaves, twigs, etc.) easier to find. Delete as much syntax as possible. If someone wants to know more about a given species, he/she can go to the suggested references. To save space in the tables, we have made shorthand designations for these references; e.g., “ECI” refers to “Willows of East Central Idaho, by Brunsfeld and Johnson, 1985.”

4. Problem: Terminology. A large amount of Latin is necessary to describe the structures of the plants. Glossaries are often cumbersome and sometimes do not adequately communicate the correct meaning to the reader.

Offered Solution: Make a clear, concise, illustrated glossary especially for willows.

5. Problem: Variation in terminology. One piece of work will refer to a structure as a scale, another will call it a floral bract. There are many other examples of this: catkin v. ament, coetaneous v. “appearing at the same time as the leaves,” etc.

Offered Solution: Include the interchangeable terms in the glossary and use clarification of these terms when necessary.

6. Problem: Written descriptions are often difficult to picture in one’s mind.

Offered Solution: Illustrate every species with a line drawing (which is usually better than a photograph for identification purposes). However, one should *not* rely upon pictures alone when deciding on the final identification of a species.

7. Problem: Nomenclature variations. Many specific names are now in synonymy; i.e., *S. rigida* Muhl., *S. glaucoptera* Andress. A single species may have as many as five common names.

Offered Solutions:

- a. Establish a final authority regarding nomenclature.
- b. Pay close attention to synonymy, clarifying what names will no longer be used.
- c. State the most accepted common name for a given species and mention the possible other names that the species might be called.

8. Problem: Capitalization. Capitalization of Latin and common names is inconsistent between works. This may cause confusion. For example, *S. eastwoodiae* is sometimes capitalized *S. Eastwoodiae* after Alice Eastwood (1859-1953), who was, of course, a person. Therefore, *Eastwoodiae* is a proper noun and should be capitalized.

Likewise, the common name may be capitalized Eastwood Willow, and other times it may be capitalized Eastwood willow. Still at other times neither word is capitalized.

Offered Solution: Establish guidelines. Utilize the most accepted form of capitalization of the Latin name, which is to use a lower case letter in the second name of the binomial: *Salix eastwoodiae*. It should be herein noted that, under botanical rules, it is proper to capitalize *Eastwoodiae*. This capitalization, however, is not well accepted.

*Eastwood Willow* may be a common name, but it is still a proper noun. Therefore, we must capitalize both words.

9. Problem: There may be several subspecies, varieties, and/or cultivars of a given willow species.

Offered Solution: Wherever possible, we have not divided species into subspecies, varieties, etc.

10. Problem: Species descriptions often vary from one piece of work to another. For example, one might say "leaves 5 to 9 centimeters long," and another might say "leaves 6 to 10 centimeters long."

Offered Solution: Say "leaves 5 to 10 centimeters long."

11. Problem: Morphological variation (within a species). Dr. Dorn (1970) writes: "No one key can be used to identify all individual willow plants because of their extensive variability."

Offered Solution: Dr. Dorn advises:

- a. "The material to be keyed should have either mature female catkins or mature leaves; catkins are preferable. Abnormal material including "sucker shoots" should be avoided. Several different catkins and different leaves should be checked while keying."
- b. "The area where the plant was found should be surveyed to determine the variability, if any, of the species. Several specimens from the area are better than only one. The area to be surveyed might include a swamp, a mountain top, or a small drainage."
- c. "The material to be keyed should be fresh; the plant should preferably be keyed in the field."
- d. "A hand lens of 10 power or more is desirable for detecting the smaller characteristics."
- e. "The material should be keyed on both flower and vegetative characters when possible. This will serve as a check. Flower characteristics are usually more reliable in case of disagreement."

12. Problem: Ecotypic variation. A species may vary due to the ecological situation that it lives in. For example, *S. arctica*, usually considered a dwarf willow (no more than 8 cm tall), may be larger when it is sheltered. Therefore, it is not always a dwarf and its stature would lead a person away from that part of a key that covers dwarf willows.

Offered Solution: Create a key which warns the field person that a species, in this case *S. arctica*, may have atypical individuals.

13. Problem: Major key criteria can vary among individuals of the same species. For example, *S. drummondiana* may or may not have pruinose twigs.

Offered Solution: Dr. Dorn has made his key in such a manner that one often can reach a given species by taking two or more paths based on morphological features. Thus, *S. drummondiana* appears twice, once at the end of a pathway for plants with pruinose twigs, and the other time at the end of a pathway for plants with non-pruinose twigs.

#### Other Advice

- a. When you have arrived at a given species, be certain to check all identification criteria in the species description.
- b. Do not try to "force" a given specimen into a species in the key by ignoring one or more identification criteria. For example, if all criteria fit except for the leaf length—say the leaves you have are 13 cm long and a given criterion is 5 to 10 cm, chances are you are trying to call it a species that it is not.
- c. Always carry a copy of Dorn (1984), a 10x hand lens, a metric ruler, and a plant press in the field during the summer. Back these up with a good dissecting scope and floras such as Hitchcock, Et al. (1969) in western Montana and Great Plains Flora Association (1986) in eastern Montana and the Dakotas.

#### Final Note

This is not the final writing of Montana Willows, it is the third approximation. At this writing, it has not yet been tested in the field. Constructive criticism and comments are both welcome and necessary.



## Description of the Ecological Zones

The Ecological Zones are based on Lackschewitz (1986), Kuchler (1964) and Lesica (1991). Four of the zones come from Lackschewitz: Alpine, Subalpine, (including Timberline, Upper Subalpine, and Lower Subalpine), Montane (including Montane Moist and Montane Dry), and Foothills/Valley (called Major Valley by Lackschewitz). We have added Plains to encompass much of central and eastern Montana.

Ecological Zone is determined by a combination of elevation, latitude, aspect, topography, and other factors. Merely giving a range of elevation for a given zone will not suffice because these factors are very interrelated. Therefore, we will herein give the major species of plants that are found in the zones.

The Plains Ecological Zone, according to Lesica (1991), is vegetated by mid-grass grasslands and shrublands dominated by Wyoming Big Sagebrush, Needle and Threadgrass, Western Wheatgrass, Blue Gramma, and Bluebunch Wheatgrass. Riparian areas are dominated by Cottonwood, Green Ash, and Willow. Isolated stands of Ponderosa Pine Woodland occur on fractured bedrock.

The Foothill/Valley Ecological Zone occupies the western valleys and rolling foothills throughout the state. The zone is dominated by Ponderosa Pine savannah and/or bunch grasses such as Bluebunch Wheatgrass and Idaho Fescue. Big Sagebrush dominates drier sites. Savannahs of Limber Pine and Rocky Mountain Juniper are common on slopes in the southwest and south-central regions.

The Montane Zone occurs in the western part of the state and in scattered upland disjuncts in the central part. It is dominated by Douglas-fir and Lodgepole Pine. Cool, more mesic slopes support Englemann Spruce and Subalpine Fir. Species found west of the Continental Divide include Western Larch, Grand Fir, and Western White Pine.

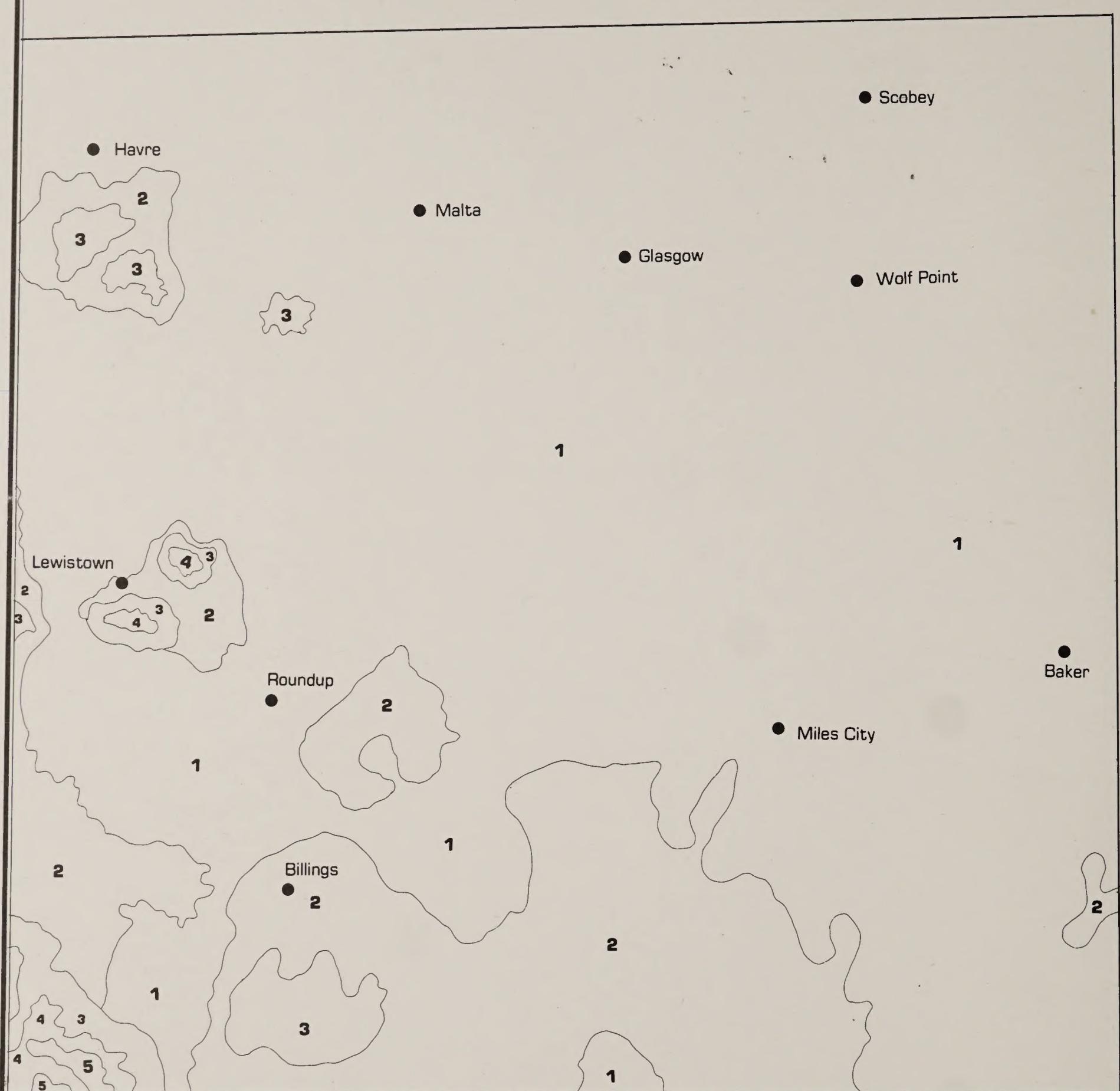
Climax vegetation in the Subalpine Zone is usually a Subalpine Fir and/or Englemann Spruce Forest. Fires have often caused a pyric disclimax forest of Lodgepole Pine. This pine often is in a thick, "dog hair" stand with little understory. Unless there is a fire, however, the climax trees will come in as the pines become senescent.

The Alpine Zone is above the treeline. It is tundra or scree. Dominant plants found here include sedge, bluegrass, Sheep fescue, cinquefoil, and small shrubs as Alpine avens, Shrub cinquefoil, and dwarf willows.



## Maps of Ecological Zones

# ECOLOGICAL ZONES



## LEGEND

- 1 — Plains**
- 2 — Foothill Valley**
- 3 — Montane**
- 4 — Subalpine**
- 5 — Alpine**

# ECOLOGICAL ZONES



## LEGEND

- 1 — Plains**
- 2 — Foothill Valley**
- 3 — Montane**
- 4 — Subalpine**
- 5 — Alpine**



## **Reference Shorthand Key**

CP - Budd and Best (1969), Wild Plants of the Canadian Prairies

ECI - Brunsfeld and Johnson (1985), Field Guide to the Willows of East-Central Idaho

GP - The Great Plains Flora Association (1986), Flora of the Great Plains

NW - Hitchcock et al. (1964), Vascular Plants of the Pacific Northwest

RDT - Hansen et al. (1988), Riparian Dominance Types of Montana

VPM - Dorn (1984), The Vascular Plants of Montana

WM - Dorn (1970), The Willows of Montana



# Facts About Willows (Salix)

Origin of Name: Celtic; sal-near, lis-water

Pronunciation: Sa (emphasis, a as in fate) liks.

Size of genus: 300+ species, 175 in North America

Distribution: Both hemispheres; Africa, South America to Arctic; sea level to 10,000+ feet.

Bark: Young smooth, brown to olive to yellow; mature deep, irregular furrows.

Wood: Soft, easy to cut, often very rapidly growing.

Pollination: Usually by insects, sometimes by wind.

Hybridization: Found to be of minor importance in east-central Idaho by Brunsfeld, but occurs where the ranges of closely related species overlap. Problematic in many places, probably not in Montana except in the case of exotic species such as Weeping Willow, White Willow, and Crack Willow.

Seeds: Numerous, minute (2-3 million per lb.), long, hairy ("cotton"), remain viable for only a few days, should be stored at room temperature with 50 plus percent humidity (then viability may last several weeks).

Vegetative Propagation: Fairly easy to root young branches. Growth hormones such as Indolacetic Acid or Indolbutyric Acid (commercial "Rootone," "Dexol") greatly increase chances of success.

Early Uses:

Eurasian: Dioscordies (Greek physician) described willow's medicinal qualities circa 60 A.D. Widespread use of bark for tonic, astringent, antiperiodic. Useful for worms, indigestion, diarrhea, dysentery.

American Indian: Similar to Eurasian, also as a purge, to clean teeth, prevent cavities, relieve headaches. Wood, twigs used for pins, pegs, backrests, fishtraps, foxtails, cradle boards, walking sticks, gambling wheels, stirrups, scrapers, baskets, drums, ropes, and meat racks.

Ecology: Either obligate or facultative wetland. Usually found close to supplemental water, although *S. scouleriana* is common in the more xeric forest, establishing after fires or avalanche. Most species found in cooler climates. Usually mesic to hydric soils.



# PLAINS ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Trees, usually with one main trunk at the base; introduced or native
  - 2a. Twigs pendulous; introduced, usually obviously planted
    - 3a. Twigs olive or brown...*S. babylonica*
    - 3b. Twigs yellow or yellow green...*S. alba* var *tristis*
  - 2b. Twigs spreading or ascending, introduced or native
    - 4a. Leaves usually green and dull dorsally, glaucous ventrally; native. (Note - if catkins are precocious, key as a shrub)...*S. amygdalooides*
    - 4b. Leaves usually dark green, shining dorsally, glaucous or pale ventrally; introduced, usually obviously planted.
    - 5a. Twigs not brittle at base; glandular processes not present on petioles near base of leaf blade or occasionally present on a few; leaves elliptic to lanceolate...*S. alba*
    - 5b. Twigs either brittle and easily broken off at the base or glandular processes present on most petioles near base of leaf blade or both, leaves various.
      - 6a. Leaves narrowly-elliptic to lanceolate, more than 3 times longer than wide, usually glaucous ventrally...*S. fragilis*
      - 6b. Leaves broadly-lanceolate to ovate, more abruptly acuminate, less than 3 times longer than wide, pale ventrally....*S. pendartra*
- 1b. Shrubs, several to many stems at base, native
  - 7a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit...*S. exigua*
  - 7b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various.
    - 8a. Leaves about equally green on both sides...*S. lasiandra*
    - 8b. Leaves obviously lighter ventrally
      - 9a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate, usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally...*S. candida*
      - 9b. Leaves not as above
        - 10a. Plants with mature pistillate catkins
          - 11a. Capsules glabrous
            - 12a. Scales yellow, deciduous in fruit...*S. lasiandra*
            - 12b. Scales dark, persistent in fruit...*S. lutea*
          - 11b. Capsules hairy
            - 13a. Leaves mostly over 5 times as long as wide, usually sharply serrate; styles 0.1-0.3 mm long...*S. petiolaris*
            - 13b. Leaves, if as much as 5 times as long as wide, not sharply serrate and the styles 0.3-.8+ mm long...*S. discolor*
        - 10b. Plants without mature pistillate catkins, leaves mature
          - 14a. Petioles usually with glands near base of leaf; leaf tips usually long, acuminate
            - 15a. Leaves mostly over 4 times as long as wide...*S. lasiandra*
            - 15b. Leaves mostly less than 4 times as long as wide...*S. serissima*
          - 14b. Petioles usually without glands; leaves mostly acute or rounded
            - 16a. Older branchlets somewhat silvery-gray, leaves mostly lanceolate ...*S. lutea*
            - 16b. Older branchlets not silvery-gray, leaves mostly elliptic, oblanceolate, or ovate
              - 17a. Leaves usually 5 times or more as long as wide, sharply serrate...*S. petiolaris*
              - 17b. Leaves mostly less than 5 times as long as wide, mostly crenate...*S. discolor*



# FOOTHILLS/VALLEY ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Trees, usually with one main trunk at the base; introduced or native
  - 2a. Twigs pendulous; introduced, usually obviously planted
    - 3a. Twigs olive or brown...*S. babylonica*
    - 3b. Twigs yellow or yellow green...*S. alba* var *tristis*
  - 2b. Twigs spreading or ascending, introduced or native
    - 4a. Leaves usually green and dull dorsally, glaucous ventrally; native. (Note: if catkins are precocious, key as a shrub)...*S. amygdaloidea*
    - 4b. Leaves usually dark green, shining dorsally, glaucous or pale beneath; introduced, usually obviously planted
    - 5a. Twigs not brittle at base; glandular processes not present on petioles near base of leaves or occasionally present on a few; leaves elliptic to lanceolate...*S. alba*
    - 5b. Twigs either brittle and easily broken off at the base or glandular processes present on most petioles near base of leaves or both; leaves various
    - 6a. Leaves narrowly-elliptic to lanceolate, more than 3 times longer than wide, usually glaucous ventrally...*S. fragilis*
    - 6b. Leaves broadly-lanceolate to ovate, more abruptly acuminate, less than 3 times longer than wide, pale ventrally...*S. pendarra*
- 1b. Shrubs, several to many stems at base; native.
  - 7a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit...*S. exigua*
  - 7b. Leaves not linear, width various, usually less than 6x as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
  - 8a. Twigs of the previous year, and sometimes of the current season, pruinose, sometimes only apparent at nodes especially behind buds
    - 9a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; leaves usually silvery pubescent ventrally, green and glabrous or glabrate dorsally...*S. drummondiana*
    - 9b. Catkins .7-1.5 cm, loosely flowered, with leafy floriferous branchlets; leaves green sericeous on both sides...*S. geyeriana*
  - 8b. Twigs not pruinose
    - 10a. Leaves about equally as green on both sides
      - 11a. Plants with mature pistillate catkins
        - 12a. Scales yellow, deciduous in fruit; petioles with glands near base of leaf on upper side...*S. lasiandra*
        - 12b. Scales dark, persistent in fruit; petioles lacking glands...*S. monochroma*
      - 11b. Plants without mature pistillate catkins, with mature leaves
        - 13a. Mature leaves lanceolate and long acuminate; petioles with glands near the tip...*S. lasiandra*
        - 13b. Mature leaves sometimes lanceolate but not long acuminate; petioles usually lacking glands...*S. monochroma*
    - 10b. Leaves obviously lighter ventrally
      - 14a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate, usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally.
      - 15a. Pistillate catkins sessile or nearly so, leaves mostly narrowly elliptic ...*S. drummondiana*
      - 15b. Pistillate catkins with leafy floriferous branchlets 5-20 mm long, leaves mostly oblanceolate to obovate...*S. sitchensis*
    - 14b. Leaves not as above
      - 16a. Plants with mature pistillate catkins
      - 17a. Capsules glabrous

- 18a. Scales yellow, green or whitish, deciduous in fruit  
 19a. Capsules mostly 7mm long or less, maturing in spring, streambanks and ditches...*S. lasiandra*  
 19b. Capsules 7-12 mm long when mature, maturing in late summer; swamps and bogs...*S. serissima*  
 18b. Scales often dark, persistent in fruit...*S. lutea*
- 17b. Capsules pubescent  
 20a. Stipes 2-5 mm long; stiles .4mm or less long; young twigs usually red-purple, appressed hairy; bark of older twigs cracked giving a white streaked appearance...*S. bebbiana*  
 20b. Stipes 2 mm or less long, or, if as long as 3 mm, the styles often over .4 mm long and twigs not as above  
 21a. Plants mostly to 1.5 m high, pistillate catkins coetaneous on leafy, floriferous branchlets 2-25 mm long; leaves and twigs often pubescent ...*S. brachycarpa*  
 21b. Plants usually well over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm; leaves and twigs glabrous or hairy; "skunk" odor when bark stripped from living twigs of the previous year...*S. scouleriana*
- 16b. Plants without mature pistillate catkins, with mature leaves  
 22a. Petioles usually with glands near base of leaves; leaf tips mostly long-accuminate...*S. lasiandra*  
 22b. Petioles usually without glands, leaf tips mostly acute or rounded  
 23a. Twigs of the year usually red-purple and appressed-hairy, bark of older twigs cracked giving a white-streaking appearance, mature buds with depressed margins ...*S. bebbiana*  
 23b. Twigs and buds not as above  
 24a. Plants with mostly oblanceolate to obovate leaves; freshly stripped bark of living twigs of previous year usually with a "skunk" odor, usually over 2 m high, often in dryer woods...*S. scouleriana*  
 24b. Plants not as above  
 25a. Leaves mostly entire or nearly so ...*S. brachycarpa*  
 25b. Leaves mostly toothed  
 26a. Older twigs somewhat silvery-gray, leaves mostly lanceolate...*S. lutea*  
 26b. Older twigs not silvery-gray, leaves often predominantly elliptic, oblanceolate, or ovate  
 27a. Leaves usually 5 times or more as long as wide, sharply serrate...*S. petiolaris*  
 27b. Leaves mostly less than 5 times as long as wide, mostly crenate...*S. discolor*

# MONTANE ECOLOGICAL ZONE KEY

(Dividers courtesy of Robert Dorn)

- 1a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit
  - 2a. Leaves green on both sides, often pubescent, scales often lanceolate or lance-linear, pubescent or sometimes glabrate...*S. exigua*
  - 2b. Leaves usually glaucous or glaucescent ventrally, glabrous when expanded; scales broader than 2a, glabrous or sometimes pubescent at base...*S. melanopsis*
- 1b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
  - 3a. Twigs pruinose, sometimes only apparent at nodes especially behind buds
    - 4a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; stipes 0.1-0.8 mm long; leaves usually densely silvery pubescent ventrally, green and glabrous or glabrate dorsally...*S. drummondiana*
    - 4b. Catkins .8-2.5 cm long, loosely flowered with leafy, floriferous branchlets 2-18 mm long; stipes 1-3 mm long; leaves not as above
      - 5a. Leaves about equally green and sericeous on both sides; scales mostly tan or brown...*S. geyeriana*
      - 5b. Leaves green and glabrate dorsally, mostly glaucous ventrally; scales mostly black or dark brown...*S. lemmmonii*
  - 3b. Twigs not pruinose
    - 6a. Leaves about equally green on both sides
      - 7a. Plants with mature pistillate catkins
        - 8a. Capsules pubescent...*S. wolfii*
        - 8b. Capsules glabrous
          - 9a. Scales yellow, green or whitish, deciduous in fruit; petioles with glands near base of leaves on upper side...*S. lasiandra*
          - 9b. Scales often dark, persistent in fruit; petioles usually lacking glands...*S. wolfii*
      - 7b. Plants without mature pistillate catkins, with mature leaves
        - 10a. Mature leaves lanceolate and long-accuminate at tip; petioles with glands near the base of the blade...*S. lasiandra*
        - 10b. Leaves sometimes lanceolate but not long-accuminate; petioles usually lacking glands
          - 11a. Leaves broadly elliptic, ovate or obovate, very finely glandular-toothed; twigs spreading pubescent...*S. tweedyi*
          - 11b. Leaves often elliptic, lanceolate, or oblanceolate, entire or toothed, sometimes glandular; twigs various
            - 12a. Plants mostly less than 2 m high; mature leaves often densely silvery pubescent...*S. wolfii*
            - 12b. Plants often over 2 m high; mature leaves mostly sparsely pubescent to glabrous...*S. boothii*
      - 6b. Leaves obviously lighter ventrally
        - 13a. Leaves narrowly elliptic, oblong, oblanceolate, or obovate; usually very densely white or silvery hairy ventrally, glabrous or glabrate and green dorsally
          - 14a. Pistillate catkins sessile or nearly so; leaves mostly narrowly elliptic...*S. drummondiana*
          - 14b. Pistillate catkins with leafy floriferous branchlets 5-20 mm long, leaves mostly oblanceolate to obovate...*S. sitchensis*
        - 13b. Leaves not as above
          - 15a. Plants with mature pistillate catkins
            - 16a. Capsules glabrous
              - 17a. Scales yellow, green, or whitish, deciduous in fruit...*S. lasiandra*

- 17b. Scales often dark, persistent in fruit
- 18a. Stipes 0.3-2 mm long; catkins on floriferous branchlets 3-15 mm long; leaves usually glabrous, elliptic to elliptic-obovate, often entire...*S. farriae*
- 18b. Stipes, catkins, and leaves without the characteristics combined as above...*S. pseudomonticola*
- 16b. Capsules pubescent
- 19a. Stipes mostly 2-5 mm long; styles 0.4 mm or less long, twigs of the year usually red-purple and appressed pubescent, bark of older twigs cracked giving a white streaking appearance...*S. bebbiana*
- 19b. Stipes 2 mm or less long, or if as long as 3 mm, the styles often over 0.4 mm long and twigs not as above
- 20a. Plants mostly to 1.5 m high, pistillate catkins coetaneous on leafy floriferous branchlets 2-25 mm long, leaves and twigs often pubescent...*S. brachycarpa*
- 20b. Plants often over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or sometimes with floriferous branchlets to 13 mm long; leaves and twigs pubescent or glabrous
- 21a. Stipes 0-2 mm long, leaves elliptic or narrowly oblanceolate and often entire, twigs of the previous year chestnut to red to red purple, usually shiny, stigmas less than 0.5 mm long
- 22a. Pistillate catkins with leafy floriferous branchlets to 1 cm long, rarely subsessile; stipes 0.5-2 mm long; styles 0.2-0.9 mm long....*S. lemmonii*
- 22b. Pistillate catkins sessile or subsessile, stipes 0-1 mm long, styles 0.4-1.5 mm long, ...*S. planifolia* var *planifolia*
- 21b. Stipes 0.8-3 mm long; leaves obovate to broadly oblanceolate, or if elliptic, then usually coarsely toothed; twigs of previous year yellowish to reddish-brown, dull; stigmas usually over 0.5 mm long  
...*S. scouleriana*
- 15b. Plants without mature pistillate catkins, with mature leaves
- 23a. Petioles usually with glands near base of leaves, leaf tips mostly long-accuminate...*S. lasiandra*
- 23b. Petioles usually without glands, leaf tips mostly acute to rounded
- 24a. Twigs of the year usually red-purple and appressed pubescent, bark of older twigs cracked giving a white-streaking appearance; mature buds with depressed margins...*S. bebbiana*
- 24b. Twigs and buds not as above
- 25a. Plants with mostly oblanceolate leaves, freshly stripped bark from twigs of the previous year usually with a skunk odor, shrub or tree over 2 m high, often in dryer woods and clearings...*S. scouleriana*
- 25b. Plants not as above
- 26a. Leaves entire or nearly so
- 27a. Leaves glabrous or nearly so
- 28a. Leaves mostly 5 times as long as wide...*S. lemmonii*
- 28b. Leaves mostly less than 5 times as long as wide
- 29a. Twigs usually shiny and reddish, dorsal leaf surface shiny  
...*S. planifolia* var *planifolia*

- 29b. Twigs mostly dull brownish, greenish or blackish; dorsal leaf surface dull...*S. farriae*
- 27b. Leaves tomentose...*S. brachycarpa*
- 26b. Most leaves toothed
  - 30a. Leaves only slightly lighter beneath, very finely glandular toothed, twigs of the year with long spreading hairs....*S. tweedyi*
  - 30b. Leaves glaucous ventrally, often coarsely toothed; twigs of the year often glabrous or with appressed hairs
    - 31a. Leaves mostly elliptic, dark green and shiny dorsally, twigs usually reddish and shiny...*S. planifolia* var *planifolia*
    - 31b. Leaves mostly lanceolate to ovate to obovate, if elliptic, the leaves usually not shiny dorsally and the twigs not reddish and shiny...*S. pseudomonticola*



# SUBALPINE ECOLOGICAL ZONE KEY

(Dividers Courtesy of Robert Dorn)

- 1a. Leaves linear to linear-elliptic, 6 times or more as long as wide, usually less than 1.2 cm wide; twigs not pruinose or tomentose, the older usually with the outer transparent surface flaking off; scales deciduous in fruit...*S. melanopsis*
- 1b. Leaves not linear, width various, usually less than 6 times as long as wide, or, if more, twigs pruinose or tomentose or the older without the outer transparent surface flaking off; scales various
  - 2a. Twigs pruinose, sometimes only apparent at nodes especially behind buds
    - 3a. Catkins 1.5-6 cm long, densely flowered, sessile or nearly so; stipes 0.1-0.8 mm long; leaves usually densely silvery pubescent beneath, green and glabrous or glabrate above...*S. drummondiana*
    - 3b. Catkins .8-2.5 cm long, loosely flowered, with leafy floriferous branchlets 2-18 mm long; stipes 1-3 mm long; leaves not as above
      - 4a. Leaves about equally green and sericeous on both sides, scales mostly tan or brown...*S. geyeriana*
      - 4b. Leaves green and glabrate above, mostly glaucous beneath, scales mostly black or dark brown...*S. lemmontii*
  - 2b. Twigs not pruinose
    - 5a. Leaves about equally green on both sides
      - 6a. Plants with mature pistillate catkins
        - 7a. Capsules pubescent
          - 8a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at the tips of twigs of the previous year...*S. barrattiana*
          - 8b. Styles 0.2-1.9 mm long; twigs not glutinous; catkins not at the tips of twigs of the previous year, subsessile or with floriferous branchlets to 20 mm long
            - 9a. Catkins 1-5 cm long, young leaves with prominently glandular margins...*S. eastwoodiae*
            - 9b. Catkins 0.8-2 cm long, young leaves usually lacking glands on margins...*S. wolfii*
        - 7b. Capsules glabrous
          - 10a. Styles 1-3 mm long, some catkins at tips of twigs of the previous year...*S. tweedyi*
          - 10b. Styles 0.2-1.5 mm long, catkins not at the tips of twigs of the previous year
            - 11a. Catkins mostly 0.8-2 cm long, stipes 0-0.8 mm long...*S. wolfii*
            - 11b. Catkins mostly 1-9 cm long, stipes 0.3-4 mm long...*S. commutata*
      - 6b. Plants without mature pistillate catkins, with mature leaves
        - 12a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
        - 12b. Twigs not glutinous
          - 13a. Leaves broadly elliptic, ovate, or obovate, very finely glandular-toothed; twigs of the year with long, spreading pubescence...*S. tweedyi*
          - 13b. Leaves often elliptic, lanceolate, or oblanceolate, entire or toothed, sometimes also glandular; twigs various
            - 14a. Young leaves with prominently glandular margins...*S. eastwoodiae*
            - 14b. Young leaves often without glandular margins
              - 15a. Leaves mostly broadly elliptic, ovate, or obovate, often densely pubescent with long, loose hairs...*S. commutata*
              - 15b. Leaves mostly lanceolate or elliptic, glabrous or pubescent
                - 16a. Plants mostly less than 2 m high; mature leaves often densely silvery pubescent...*S. wolfii*
                - 16b. Plants often over 2 m high, mature leaves mostly sparsely pubescent to glabrous...*S. boothii*
        - 5b. Leaves obviously lighter ventrally than dorsally
          - 17a. Leaves elliptic-obovate to oval, mostly leathery, dark green dorsally, silvery hairy ventrally becoming glabrate; some catkins at tips of twigs of the season...*S. vestita*

- 17b. Leaves and catkins not as above
- 18a. Leaves narrowly elliptic, oblong, oblanceolate, to lanceolate, usually very densely white or silvery pubescent ventrally, glabrous or glabrate and green dorsally; stipes 1 mm or less long...*S. drummondiana*
- 18b. Leaves not as above, stipes various
- 19a. Plants with mature pistillate catkins
- 20a. Capsules glabrous
- 21a. Stipes 0.3-2 mm long; catkins on floriferous branchlets 3-15 mm long; leaves usually glabrous, elliptic to elliptic-obovate, often entire...*S. farriae*
- 21b. Stipes, catkins, and leaves without characteristics combined as above
- 22a. Catkins on floriferous branchlet(s) 10-30 mm long ...*S. barclayi*
- 22b. Catkins sessile or on floriferous branchlets 8-12 mm long
- 23a. Catkins, or some of them, at tips of twigs of the previous years styles 1-3 mm long; leaves finely glandular toothed...*S. tweedyi*
- 23b. Catkins not at the tips of twigs of the previous year, styles 0.5-1.8 mm long; leaves crenate-serrate ...*S. pseudomonticola*
- 20b. Capsules pubescent
- 24a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at tips of twigs of the previous year...*S. barrattiana*
- 24b. Styles, twigs, and catkins not combined as above
- 25a. Plants mostly to 1.5 m high; pistillate catkins coetaneous on leafy, floriferous branchlets 2-25 mm long; leaves and twigs often pubescent
- 26a. Pistillate catkins 0.5-2 cm long, floriferous branchlets 2-10 mm long, stipes less than 0.5 mm long, petioles mostly 1-3 mm long...*S. brachycarpa*
- 26b. Pistillate catkins (1.5) 2-5 cm long, floriferous branchlets 5-25 mm long, stipes 0-1.5 mm long, petioles often over 3 mm long...*S. glauca*
- 25b. Plants often over 1.5 m high; pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm long; leaves and twigs glabrous or pubescent
- 27a. Pistillate catkins with leafy floriferous branchlets to 1 cm long, rarely subsessile; stipes 0.5-2 mm long; styles 0.2-0.7 mm long...*S. lemmonii*
- 27b. Pistillate catkins sessile to subsessile; stipes 0.1 mm long, styles 0.4-1.5 mm long...*S. planifolia*
- 19b. Plants without mature pistillate catkins, with mature leaves
- 28a. Twigs glutinous, staining pressing papers yellow or green ...*S. barrattiana*
- 28b. Twigs not glutinous
- 29a. Most leaves entire or nearly so
- 30a. Leaves glabrous or nearly so
- 31a. Leaves mostly 5 times or more as long as wide ...*S. lemmonii*
- 31b. Leaves mostly less than 5 times as long as wide
- 32a. Twigs usually shiny and reddish; upper leaf surface shiny...*S. planifolia*
- 32b. Twigs mostly dull brownish, greenish, or blackish; leaf surface dull...*S. farriae*

- 30b. Leaves usually obviously hairy, rarely glabrate
  - 33a. Leaves 1.5-7 cm long, usually sparsely to moderately pubescent; petioles mostly over 3 mm long...*S. glauca*
  - 33b. Leaves 0.5-4 cm long, usually densely pubescent; petioles mostly less than 3 mm long...*S. brachycarpa*
- 29b. Most leaves toothed
  - 34a. Leaves only slightly lighter beneath, very finely glandular; twigs of the year with long, spreading pubescent...*S. tweedyi*
  - 34b. Leaves glaucous ventrally, often more coarsely toothed; twigs often glabrous or with appressed hairs
    - 35a. Leaves mostly elliptic, dark green and shiny above; twigs usually reddish and shiny...*S. planifolia*
    - 35b. Leaves mostly lanceolate to ovate or obovate, if elliptic, the leaves not shiny above and the twigs not reddish and shiny
      - 36a. Leaf midrib and petiole often red, blade usually ovate, obovate, or broadly elliptic, twigs of the year pubescent...*S. pseudomonticola*
      - 36b. Leaf midrib and petiole usually green, blades often lanceolate, elliptic, or oblanceolate; twigs of year often glabrous...*S. barclayi*



# ALPINE ECOLOGICAL ZONE KEY

(Most dividers courtesy of Robert Dorn)

- 1a. Plants creeping shrubs 1-8 cm high, sometimes higher in *S. arctica*
  - 2a. Leaves 7 (9) mm or less long, not glaucous; capsules glabrous; usually on limestone...*S. rotundifolia*
  - 2b. Leaves mostly over 7 mm long, often glaucous ventrally; capsules pubescent
    - 3a. Leaf tip usually rounded, blade prominently reticulate-veined ventrally, styles less than 0.5 mm long...*S. reticulata*
    - 3b. Leaf tip usually pointed, blades not reticulate-veined; styles 0.3-2 mm long
      - 4a. Leaves mostly elliptic to oval, glaucous ventrally, old ones usually not persisting; catkins 1-5 cm long; sometimes over 8 cm tall in protected places...*S. arctica*
      - 4b. Leaves narrowly elliptic to elliptic, usually green beneath, old ones often persisting; catkins mostly 0.6-2 cm long...*S. cascadensis*
- 1b. Plants usually erect shrubs over 8 cm high, sometimes creeping in *S. vestita*, *S. glauca*
  - 5a. Leaves about equally green on both sides
    - 6a. Plants with mature pistillate catkins
      - 7a. Capsules pubescent...*S. barrattiana*
      - 7b. Capsules glabrous...*S. tweedyi*
    - 6b. Plants without mature pistillate catkins
      - 8a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
      - 8b. Twigs not glutinous...*S. tweedyi*
  - 5b. Leaves obviously lighter ventrally than dorsally
    - 9a. Leaves elliptic-obovate to oval, mostly leathery, dark green dorsally, silvery hairy ventrally (becoming glabrate), some catkins at tips of twigs of the season; rarely low, creeping...*S. vestita*
    - 9b. Leaves and catkins not as above
      - 10a. Plants with mature pistillate catkins
        - 11a. Styles 1-2.5 mm long; twigs glutinous; catkins sessile or nearly so, some at the tips of twigs of the previous year...*S. barrattiana*
        - 11b. Styles, twigs, and catkins not combined as above
          - 12a. Pistillate catkins coetaneous on leafy floriferous branchlets 2-25 mm long; leaves and twigs often pubescent; rarely low, creeping...*S. glauca*
          - 12b. Pistillate catkins precocious or coetaneous, sessile or nearly so or sometimes with floriferous branchlets to 13 mm long; twigs glabrous or pubescent ...*S. planifolia* var *monica*
      - 10b. Plants without mature pistillate catkins, mature leaves
        - 13a. Twigs glutinous, staining pressing papers yellow or green...*S. barrattiana*
        - 13b. Twigs not glutinous
          - 14a. Most leaves entire or nearly so
            - 15a. Leaves glabrous or nearly so...*S. planifolia* var *monica*
            - 15b. Leaves usually obviously pubescent, rarely glabrate; rarely low creeping...*S. glauca*
          - 14b. Most leaves toothed
            - 16a. Leaves only slightly lighter ventrally, very finely glandularly toothed; twigs with long, spreading pubescence...*S. tweedyi*
            - 16b. Leaves glaucous ventrally, often more coarsely toothed; twigs often glabrous or with appressed pubescence...*S. planifolia* var *monica*





**Salix L.  
Willow  
Genus Description**

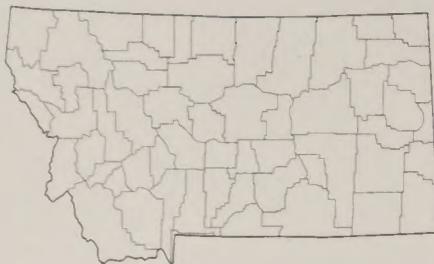
**Vegetative Structures**

Habit: large tree to prostrate shrub  
 Leaves  
 Shape: very variable, from obovate to linear.  
 Structure: simple  
 Placement: alternate  
 Margins: entire to serrate to crenate serrate  
 Petioles: much shorter than leaf blades, sometimes glandular at summit  
 Stipules: persistent or deciduous or caducous or absent  
 Remarks: Plants of wet to moist places, often an important component of riparian areas (both climax and seral), often phreatophytic

**Sexual Structures**

Catkins: Erect to pendulous, usually coetaneous, sometimes precocious or serotinous, sometimes subtended by a bract (not to be confused with floral bracts which are herein called scales)  
 Flowers: Unisexual, subtended by a scale (floral bract) or 1-2 nectar glands or cupular disk  
 Perianth: absent or vestigial  
 Stamens: 1 to 12+  
 Pistils: 1, bicarpellate  
 Stigmas: 2 to 4 lobed  
 Styles: well developed to none, 1  
 Ovary: superior  
 Fruit: 2 valved capsule

Drawing courtesy of New York Botanical Garden.



Introduced



*Salix alba* L.  
White Willow

**General**

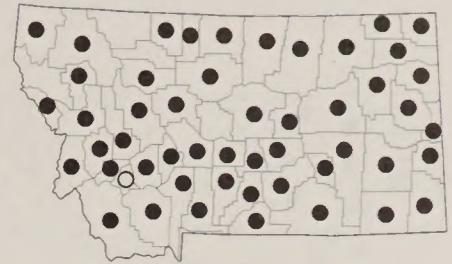
Synonyms: —  
Other common name(s): —  
Reference(s): GP, ECI  
Pronunciation: al- (emphasis) ba  
(‘a’ as in Persia)  
Ecological Zone(s): Foothills/  
Valley, Plains  
Wetland status: facultative  
Remarks: Var. *vitellina* Stokes-  
exotic, Yellowstem White Willow,  
escapes cultivation on the plains; var.  
*calva* G.F. May - exotic, White  
Willow, planted on plains and in  
western valleys. Probably does not  
escape, many cultivars. Introduced  
for aspirin (acetylsalicylic acid)  
gunpowder, aesthetics, sentiment,  
shade from Europe in colonial times.

**Vegetative Structures**

Habit: medium tree  
Height: 30 meters (100 ft.)  
Twigs: weeping and yellow to  
yellow-green in var. *tristis*; golden  
yellow to orange in var. *vitellina*;  
finely appressed pubescent at least  
on twigs forming in summer  
Mature leaves:  
Dorsal: glabrous, shiny green  
Ventral: strongly glaucous, lighter  
Margin: serrate  
Length: 10-15 cm  
Width: 25-40 mm  
Shape: lanceolate to elliptic,  
acute  
Stipules: caducous  
Remarks: Leaves often silky  
pubescent ventrally when young,  
often asymmetric at tip - at least in  
var. *vitellina*

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: pale to yellowish  
green  
Scale hair: pubescent  
Catkins, staminate  
Length: 3-5 cm  
Width:  
Catkins, pistillate  
Length: 5-7 mm  
Capsules  
Length: 3.5-5 mm  
Other: ovoid-conic, glabrous  
Styles: .2-.4 mm  
Stigmas: —  
Stamens: 2  
Remarks: Flowers in May



*Salix amygdaloidea* Anderss  
Peachleaf Willow

**General**

Synonyms: —  
Other Common Name(s): —  
Reference(s): CP, GP, NW, RDT,  
VPM, WM  
Pronunciation: a- ('a' as in Persia)  
mig- (emphasis) dal-oid ('o' as in  
note), ez ('e' as in mete)  
Ecological Zone(s): Foothills/  
Valley, Plains  
Wetland Status: facultative  
Remarks: Grows along the major  
water courses in the state. Common  
on floodplains. Alluvial soil.  
Cheyenne Indians made a tea from  
the bark for diarrhea.

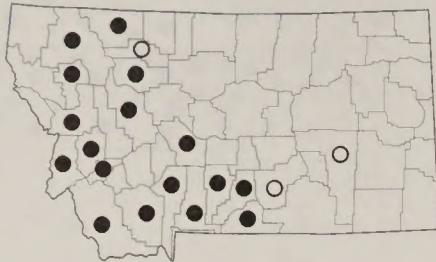
**Vegetative Structures**

Habit: tall shrub or medium tree  
Height: 12 meters (40 ft.), trunk  
often leaning  
Twigs: slender, yellow to reddish  
brown, not brittle, spreading to  
drooping  
Mature leaves:  
Dorsal: glabrous yellow green  
Ventral: glaucous  
Margin: finely serrate  
Length: 3-10 cm  
Width: 10-30 mm  
Shape: lanceolate to oblanceolate,  
acute  
Stipules: usually caducous  
Remarks: Bark light brown

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: yellowish  
Scale hair: deciduous, villous  
Catkins, staminate  
Length: 4-7 cm  
Width: 6-10 mm  
Catkins, pistillate  
Length: 3-8 cm  
Capsules  
Length: 5-7 mm  
Other: glabrous, ovoid  
Styles: .2-.4 mm  
Stigmas: bilobed, .2-.5 mm  
Stamens: 4-7  
Remarks: Flowers in May

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde



### *Salix arctica* Pallas Arctic Willow

#### General

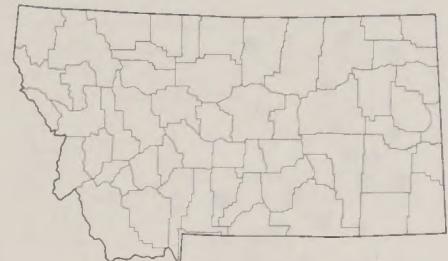
Synonyms: *S. anglorum* (Cham.)  
Other common name(s): Creeping Willow; Arctic Willow  
Reference(s): ECI, VPM, WM  
Pronunciation: ar- ('a' as in far) tic (emphasis) ca ('a' as in Persia)  
Ecological Zone(s): Alpine  
Wetland Status: facultative  
Remarks: Easily confused with *S. reticulata*

#### Vegetative Structures

Habit: low, creeping shrub  
Height: to 8 cm (3.5 in.)  
Twigs: glabrous or sparsely hairy, yellowish to purplish-black  
Mature leaves:  
    Dorsal: glabrous, green  
    Ventral: slightly to medium glaucous, veiny  
    Margin: entire, finely serrate  
    Length: .5-4 cm  
    Width: 6-25 mm  
    Shape: oblanceolate to elliptic to oval to lanceolate  
Stipules: absent or minute  
Remarks: Mat forming above treeline. Occasionally more than 8 cm tall in sheltered places. Its mats are looser than *S. cascadensis* or *S. reticulata*

#### Sexual Structures

Catkins, general  
    Emergence time: coetaneous to serotinous  
    Scale color: dark brown to black  
    Scale hair: long pubescent  
Catkins, staminate  
    Length: 1-5 cm  
    Width: -  
Catkins, pistillate  
    Length: 1-6 cm  
Capsules  
    Length: 4-8 mm  
    Other: villous tomentose  
Styles: .3-2 mm  
Stigmas: bilobed, 1-2.5 mm (including style)  
Stamens: 2  
Remarks: —



Introduced



*Salix babylonica* L.  
Weeping Willow

**General**

Synonyms: —  
Other common name(s): —  
Reference(s): ECI, WM  
Pronunciation: bab-i-lon (emphasis)  
-i ('i' as in pin) -ka ('a' as in Persia)  
Ecological Zone(s): Foothills/  
Valley, Plains  
Wetland Status: facultative  
Remarks: Exotic. Planted around  
habitation (sometimes abandoned)  
and on ditchbanks. Rarely escapes.  
Introduced from Europe, native of  
China (i.e., willow pattern of ceramic  
dishes), called *S. babylonica* by L.  
for 137th Psalm

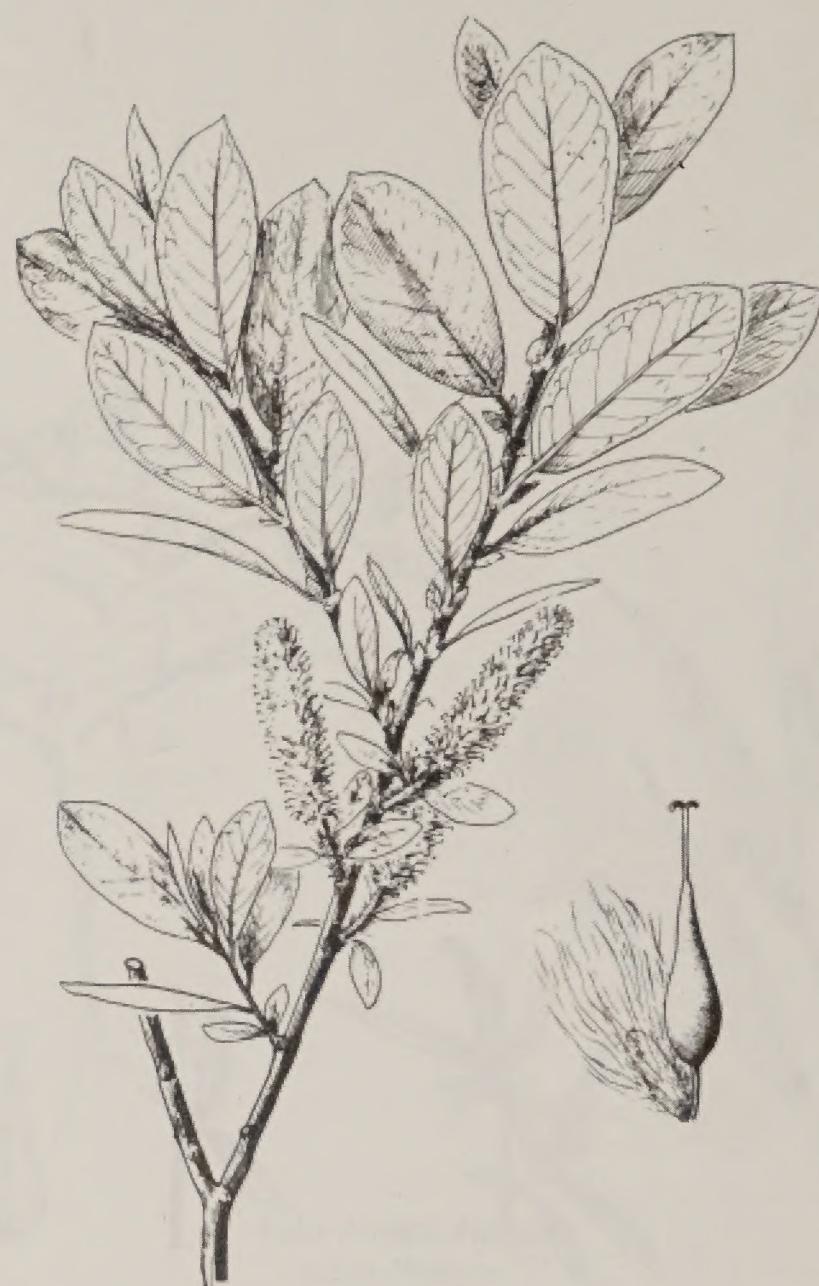
**Vegetative Structures**

Habit: medium tree  
Height: 12 meters (40 ft.)  
Twigs: weeping, almost to the  
ground, olive to brownish  
Mature leaves:  
Dorsal: glabrous, shiny green  
Ventral: strongly glaucous, glabrate  
Margin: serrate  
Length: 8-12 cm  
Width: 10-25 mm  
Shape: lanceolate to linear,  
acuminate  
Stipules: caducous  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: pale yellow to green  
Scale hair: pubescent  
Catkins, staminate  
Length: 3-6 cm  
Width: —  
Catkins, pistillate  
Length: 1-6 cm  
Capsules  
Length: 3.5-5 mm  
Other: glabrous, ovoid-conic  
Styles: nearly obsolete  
Stigmas: —  
Stamens: 3-5+  
Remarks: —

Drawing courtesy of University of Washington Press.



***Salix barclayi* Anderss  
Barclay Willow**

**General**

Synonyms: —  
Other common name(s): —  
Reference(s): ECI, NW, ECI, NW,  
VPM, WM  
Pronunciation: bar- ('a' as in fan)  
kla- ('a' as in fate) i (emphasis, 'i' as  
in pine)  
Wetland Status: facultative  
Ecological Zone(s): Subalpine  
Remarks: Along streams and in  
meadows, hard to distinguish from *S.  
psuedomonticola*

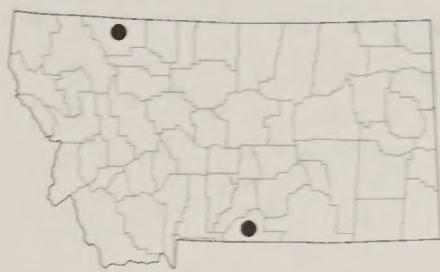
**Vegetative Structures**

Habit: medium shrub  
Height: 4 meters (3-13 ft.)  
Twigs: glabrous to moderate  
pubescent, dark  
Mature leaves:  
Dorsal: glaucous, green, midrib  
pubescent  
Ventral: glabrous, glaucous lighter  
than dorsal  
Margin: finely toothed  
Length: 1.5-8 mm  
Width: 5-35 mm  
Shape: obovate to elliptic to  
ob lanceolate to lanceolate  
Stipules: eventually deciduous  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous to  
serotinous  
Scale color: dark brown to black  
Scale hair: long pubescent  
Catkins, staminate  
Length: 1-3 cm  
Width: 10-15 mm  
Catkins, pistillate  
Length: 1-8 cm  
Other: glabrous  
Styles: .7-2 mm  
Capsules: glabrous  
Stigmas: .3-.5 mm  
Stamens: 2  
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde



*Salix barrattiana* Hook.  
Barratt Willow

#### General

Synonyms: —  
Other common name(s): —  
Reference(s): NW, VPM, WM  
Pronunciation: bar- ('a' as in fat)  
rat- ('a' as in fat) te- (emphasis, 'e'  
as in mete) ana ('a' as in fate, 'a' as  
in Persia)  
Ecological Zone(s): Subalpine,  
Montane  
Wetland Status: facultative  
Remarks: Moist places in high  
mountains, easy to confuse with *S.  
planifolia*; Considered sensitive in  
MT by The Nature Conservancy,  
extremely rare in MT, globally  
secure.

#### Vegetative Structures

Habit: low to medium shrub  
Height: .3-2 m (1-6 ft.)  
Twigs: conspicuously spreading,  
villous when young; pubescent,  
glutinous when mature  
Mature leaves:  
Dorsal: villous tomentose, gray  
Ventral: villous, tomentose, gray  
Margin: usually entire  
Length: 4-9 cm  
Width: 12-55 mm  
Shape: broadly elliptic to elliptic-  
ob lanceolate to elliptic-obovate to  
ovate  
Stipules: inconspicuous, caducous  
Remarks: Twigs stain pressing  
papers yellow or green

#### Sexual Structures

Catkins, general  
Emergence time: coetaneous to  
precocious  
Scale color: blackish  
Scale hair: long pubescent  
Catkins, staminate  
Length: 3 cm  
Width: 15 mm  
Catkins, pistillate  
Length: 3-9 cm  
Capsules: pubescent  
Styles: .7-2.5 mm  
Stigmas: .3-.5 mm  
Stamens: 2  
Remarks: —



*Salix bebbiana* Sarg.  
Bebb Willow

**General**

Synonyms: —  
Other common name(s): Beaked willow  
Reference(s): CP, ECI, GP, NW, RDT, VPM, WM  
Pronunciation: beb-(‘e’ as in met) e- (emphasis, ‘e’ as in mete) ana (‘a’ as in fate, ‘a’ as in Persia)  
Ecological Zone(s): Montane, Foothills/Valley  
Wetland status: facultative  
Remarks: Occurs in many willow habitats, not in the wettest sites, often taller than associated willow species, often on the outer edge of willow thickets. Very common.

**Vegetative Structures**

Habit: medium to large shrub  
Height: 1-4 meters (3-13 ft.)  
Twigs: red-purple, appressed pubescent, when young, cracked when older - look streaked, slender, divaricate  
Mature leaves:  
Dorsal: pubescent to glabrate, deep green  
Ventral: villous or glaucous or glabrous, rugous  
Margin: usually entire  
Length: 4-8 cm  
Width: 15-30 mm  
Shape: elliptic to elliptic ovate to oval to oblanceolate  
Stipules: usually inconspicuous, deciduous  
Remarks: Veins prominently raised on the ventral side of leaves.

**Sexual Structures**

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: yellowish to light brown, may have reddish tips  
Scale hair: pilose or villous  
Catkins, staminate  
Length: 1-4 cm  
Width: —  
Catkins, pistillate  
Length: 1.5-6 cm  
Capsules  
Length: 5-10 mm  
Other: finely short pubescent, ovoid to conic, long beaked  
Styles: .1-.4 mm  
Stigmas: .3-5 mm  
Stamens: 2  
Remarks: Flowers in late April to May



*Salix boothii* Dorn  
Booth Willow

**General**

Synonyms: —  
Other common name(s): Firmleaf Willow, Blueberry Willow  
Reference(s): ECI, RDT, VPM  
Pronunciation: booth- ('oo' as in move) i- (emphasis, 'i' as in pine) eye  
Ecological Zone(s): Subalpine  
Wetland Status: facultative  
Remarks: Often associated with *S. drummondiana* and *S. geyeriana*, also associates with *S. bebbiana* and *S. pseudomonticola*. Incorrectly called *S. myrtillifolia* Andress; this is not synonymy. Along streams, deep fine texture soils

**Vegetative Structures**

Habit: medium to large shrub  
Height: 1-4 meters (3-13 ft)  
Branchlets: yellow, orange or brown, pubescent  
Mature leaves:  
    Dorsal: sparsely pubescent to glabrous, green  
    Ventral: same  
Margin: serrulate to subentire  
Length: 1.5-8.5 cm  
Width: 6-22 mm  
Shape: elliptic to broadly lanceolate  
Stipules: persistent, 5-12 mm long  
Remarks: Leaves are unique—they are glabrous but not glaucous

**Sexual Structures**

Catkins, general  
    Emergence time: coetaneous, sometimes precocious  
    Scale color: black  
    Scale hair: densely pubescent, may be glabrous at tip  
Catkins, staminate  
    Length: 1-2 cm  
    Width: —  
Catkins, pistillate  
    Length: 1-5.5 cm  
    Other: glabrous  
Capsules  
    Length: 3-6 mm  
    Other: glabrous  
Styles: .3-.8 mm  
Stigmas: —  
Stamens: 2  
Remarks: —



*Salix brachycarpa* Nutt.  
Short Fruited Willow

#### General

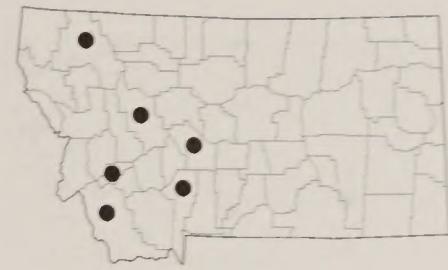
Synonyms: —  
Other common name(s): —  
Reference(s): CP, ECI, NW, VPM,  
WM  
Pronunciation: brak- ('a' as in fat) e-  
(‘e’ as in mete) carp- (emphasis) a  
(‘a’ as in Persia)  
Ecological Zone(s): Subalpine,  
Montane, Foothills/Valley  
Wetland status: facultative  
Remarks: Found at the edges of wet  
meadows, not on the wettest sites,  
parent material often calcareous.

#### Vegetative Structures

Habit: erect, low shrub  
Height: .2-2 meters (.6-6 ft.)  
Twigs: yellowish brown to reddish  
brown to dark red, often tomentose  
Mature leaves:  
    Dorsal: tomentose  
    Ventral: lighter than dorsal,  
        strongly glaucous  
    Margin: entire  
    Length: .6-3.2 cm  
    Width: 3-15 mm  
    Shape: obovate to elliptic to ovate  
Stipules: inconspicuous, deciduous  
Remarks: Forms a tight hemisphere  
when browsed

#### Sexual Structures

Catkins, general  
    Emergence time: coetaneous  
    Scale color: light brown, rarely  
        black  
    Scale hair: pubescent  
Catkins, staminate  
    Length: .4-2 cm  
    Width: 5-6 m  
Catkins, pistillate  
    Length: .5-2 mm  
    Other: densely pubescent  
Capsules  
    Length: 3-5 mm  
    Other: densely pubescent  
    Styles: .5-1.5 mm  
    Stigmas: sometimes cleft  
    Stamens: 2  
Remarks: Pistillate catkins 10-15  
mm wide; catkins numerous, male  
almost glabrous, dropped later in the  
season than most willows



*Salix candida* Fluegge ex. Willd.  
Hoary Willow

#### General

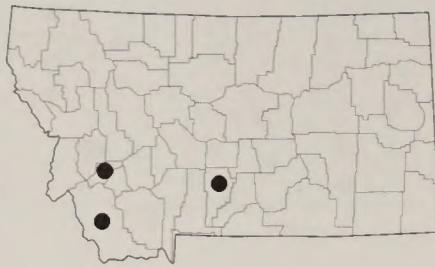
Synonyms: —  
Other common name(s): Sageleaf Willow  
Reference(s): ECI, GP, NW, CP, VPM, MW  
Pronunciation: kan- (emphasis) di- ('i' as in pin) da ('a' as in Persia)  
Ecological Zone(s): Subalpine  
Wetland status: facultative  
Remarks: Wet, mossy bogs; uncommon; wet, organic soils

#### Vegetative Structures

Habit: low to medium shrub  
Height: 1-4 meters, mostly less (.5-13 ft.)  
Twigs: yellowish or reddish brown, hairy, thick  
Mature leaves:  
    Dorsal: glabrous, dark green, tomentose  
    Ventral: pubescent, becoming white tomentose  
Margin: revolute entire to serrulate  
Length: 1-5 cm  
Width: 3-8 mm  
Shape: oblanceolate to oblong to narrowly elliptic  
Stipules: persistent on vigorous shoots, otherwise caducous, 5-10 mm long,  
Remarks: Plants erect with few branches at top

#### Sexual Structures

Catkins, general  
Emergence time: coetaneous  
Scale color: yellow to brown  
Scale hair: villous  
Catkins, staminate  
Length: 1.5-2.5 cm  
Width: —  
Catkins, pistillate  
Length: 1.5-6 cm  
Capsules  
Length: 4-8 mm  
Other: white tomentose, ovoid  
Styles: .8-1.7 mm  
Stigmas: bilobed .2-.5 mm  
Stamens: 2  
Remarks: Anthers purple, flowers in May



***Salix cascadensis* Cockerell  
Cascade Willow**

**General**

Synonyms: —  
Other common name(s): Creeping Willow  
Reference(s): NW, VPM, WM  
Pronunciation: kas-kad- ('a' as in fate) den- (emphasis) sis  
Ecological Zone(s): Alpine  
Wetland status: facultative  
Remarks: Considered sensitive in MT by The Nature Conservancy, extremely rare in MT, globally secure.

**Vegetative Structures**

Habit: low creeping shrub  
Height: to 8 cm (3-5 in.)  
Twigs: —  
Mature leaves:  
    Dorsal: glabrous, green  
    Ventral: glabrate, green  
    Margin: entire, sometimes pilose  
    Length: .5-2.5 cm  
    Width: 2-8 mm  
    Shape: narrowly elliptic, acute  
Stipules: —  
Remarks: Mat forming above treeline, old leaves often persist, plant rhizomatous

**Sexual Structures**

Catkins, general  
    Emergence time: coetaneous  
    Scale color: dark brown to black  
    Scale hair: long, pubescence longer than scale  
Catkins, staminate  
    Length: .6-1.2 cm  
    Width: —  
Catkins, pistillate  
    Length: 1-2.5 cm  
Capsules  
    Length: 4-5 mm  
    Other: villous tomentose  
    Styles: .3-2 mm  
    Stigmas: bilobed, .2-.5 mm  
    Stamens: 2  
Remarks: —



*Salix commutata* Bebb.  
Undergreen Willow

**General**

Synonyms: —  
Other common name(s): Greenbacked Willow  
Reference(s): ECI, NW, NW, VPM  
Pronunciation: kom-mu- (emphasis, 'u' as in mute) tat- ('a' as in fate) a ('a' as in Persia)  
Ecological Zone(s): Subalpine  
Wetland status: facultative  
Remarks: Wet areas, near lakes, several varieties

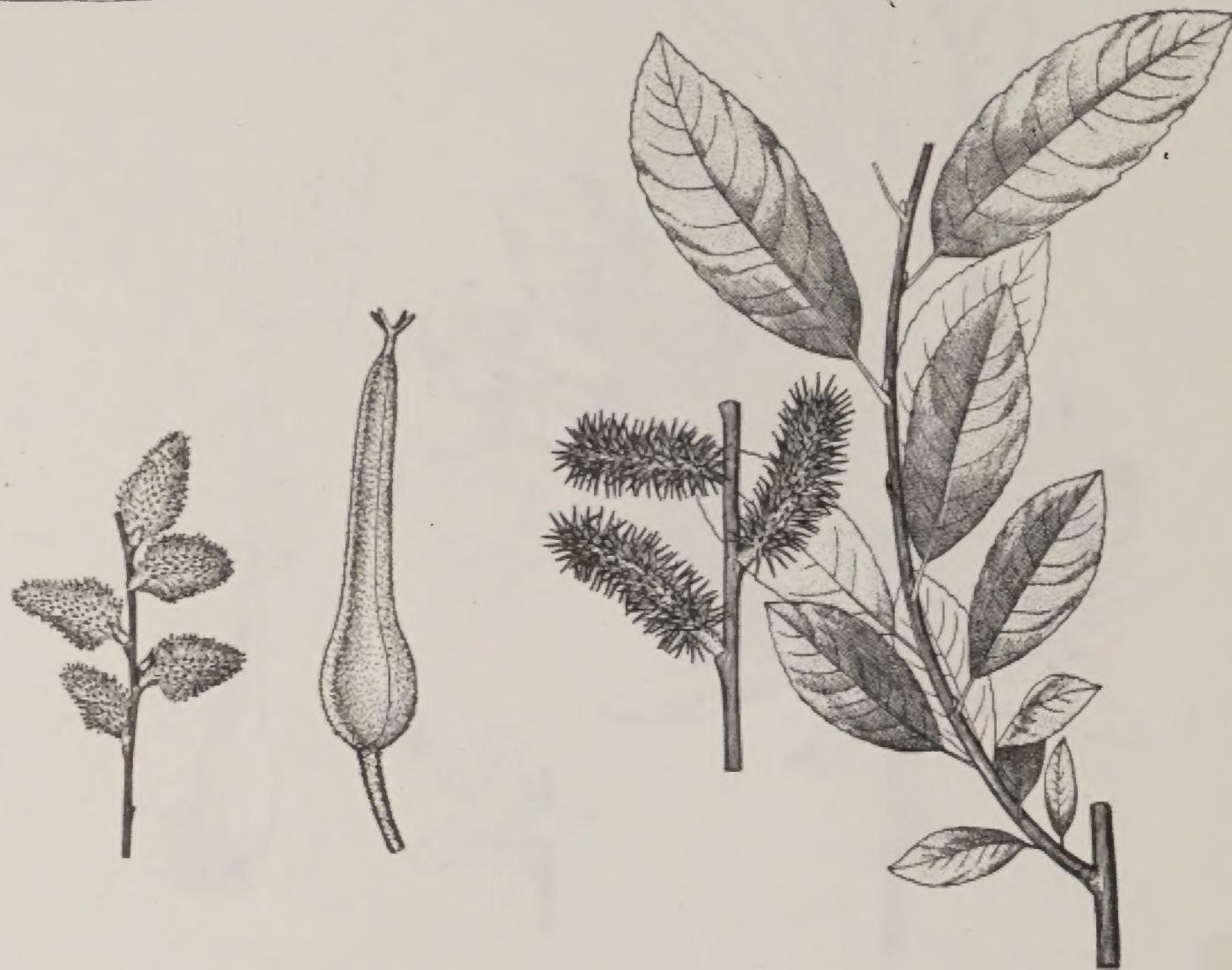
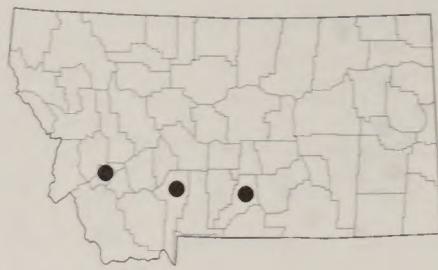
**Vegetative Structures**

Habit: medium to large shrub  
Height: 1-3 meters (3-10 ft.)  
Twigs: spreading erect pubescence, red to brownish  
Mature leaves:  
    Dorsal: long villous, green  
    Ventral: same  
    Margin: entire to gland toothed  
    Length: 1.5-8 cm  
    Width: 5-35 mm  
    Shape: elliptic to elliptic-ovate to obovate  
Stipules: often persistent, foliaceous  
Remarks: Leaves may eventually be glabrate

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous or serotinous  
Scale color: light to dark brown  
Scale hair: long, wooly villous  
Catkins, staminate  
    Length: 1-3 cm  
    Width: 10 cm  
Catkins, pistillate  
    Length: 3-9 cm  
Capsules  
    Length: 3-6 mm  
Other: glabrous to sparsely hairy  
Styles: .5-1 mm  
Stamens: 2  
Stigmas: more or less lobed  
Remarks: —

Drawing courtesy of New York Botanical Garden. Map courtesy of Steve Chadde



*Salix discolor* Muhl.

Pussy Willow

**General**

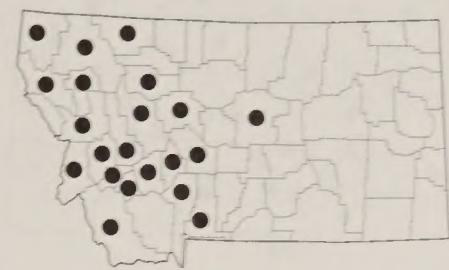
Synonyms: —  
Other common name(s): —  
Reference(s): GP, VPM, WM  
Pronunciation: dis- (emphasis) kuler ('e' as in her)  
Ecological Zone(s): Foothills/  
Valley, Plains  
Wetland status: facultative  
Remarks: Wet places, cultivated for  
the pistillate catkins ("Pussy Wil-  
lows")

**Vegetative Structures**

Habit: large shrub or small tree  
Height: to 6 meters (20 ft.)  
Twigs: stout, reddish to dark brown,  
glabrous (pubescent when very  
young)  
Mature leaves:  
Dorsal: dark green  
Ventral: pale glaucous  
Margin: subentire to serrulate to  
crenate  
Length: 3-10 cm  
Width: 10-30 mm  
Shape: elliptic to ovate to obovate  
Stipules: 3-10 mm long, roundish to  
semi-ovate  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: precocious  
Scale color: dark brown to black  
Scale hair: villous  
Catkins, staminate  
Length: 1.5 to 5 cm  
Width: —  
Catkins, pistillate  
Length: 2-9 cm  
Capsules  
Length: 5-10 mm  
Other: finely gray pubescent,  
ovoid, lanceolate-rostrate  
Styles: .3-.8 mm  
Stigmas: —  
Stamens: 2  
Remarks: Flowers in May



*Salix drummondiana* Barratt.  
Drummond Willow

**General**

Synonyms: —  
Other common name(s): Bluestem Willow  
Reference(s): ECI, GP, NW, RDT, VPM, WM  
Pronunciation: drum- ('u' as in tub) mond-e- ('e' as in mete) ana (emphasis, 'a' as in fate, 'a' as in Persia)  
Ecological Zone(s): Montane, Subalpine  
Wetland status: facultative  
Remarks: Often associated with *S. geyeriana* and *S. boothii*, mostly along streams, may hybridize with *S. sitchensis*, hard to distinguish from *S. lemmontii*

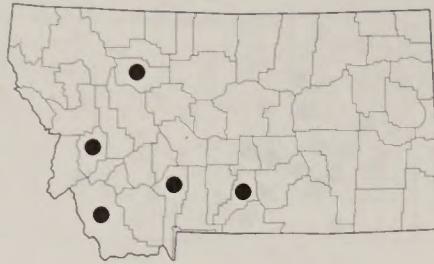
**Vegetative Structures**

Habit: low to medium shrub  
Height: 1-4 meters (5-13 ft.)  
Twigs: pruinose, finely pubescent becoming glabrous  
Mature leaves:  
Dorsal: glabrate to glabrous, green  
Ventral: densely, white or silvery pubescent  
Margin: entire, revolute  
Length: 7-9 cm  
Width: 3-30 mm  
Shape: elliptic to lanceolate to oblanceolate  
Stipules: narrow, caducous  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: dark brown to black  
Scale hair: long pubescent  
Catkins, staminate  
Length: 1.5-3 cm  
Width: 15 mm  
Catkins, pistillate  
Length: 1.5-6 cm  
Capsules  
Length: 3-6 mm  
Other: dense, shortly pubescent  
Styles: .4-1.3 mm  
Stigmas: .2-.6 mm  
Stamens: 2  
Remarks: Staminate plants are rare

Drawing by David Mattson in "Field Guide to the Willows of East Central Idaho." Permission courtesy of Steven Brunsfeld. Map courtesy of Steve Chadde.



*Salix eastwoodiae* Cockerell  
Eastwood Willow

#### General

Synonyms: —  
Other common name(s): —  
Reference(s): ECI, VPM  
Pronunciation: east-wood-e ('e' as in mete) -a (emphasis, 'a' as in fate)  
Ecological Zone(s): Subalpine  
Wetland status: facultative  
Remarks: Moist but well drained soils

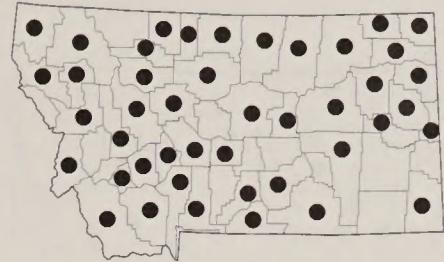
#### Vegetative Structures

Habit: low to medium shrub  
Height: 1-2 meters (3-7 ft.)  
Twigs: loosely appressed pubescent, hairs curly or wavy  
Mature leaves:  
    Dorsal: densely pubescent, gray to silver  
    Ventral: same  
    Margin: gland toothed, prominently glandular when young  
    Length: 1-7 cm  
    Width: 5-20 mm  
    Shape: elliptic to oblanceolate  
Stipules: 1.5-8 mm, sooner or later deciduous  
Remarks: Leaves get less pubescent with advancing maturity

#### Sexual Structures

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: dark brown to black  
Scale hair: long, wavy  
Catkins, staminate  
Length: 1-5 cm  
Width: —  
Catkins, pistillate  
Length: 1-5 cm  
Capsules  
Length: —  
Other: densely to sparsely hairy to glabrous  
Styles: .4-1.9 mm  
Stigmas: —  
Stamens:  
Remarks: Catkins on leafy branchlets

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix exigua* Nutt.  
Streambank Willow

#### General

Synonyms: *S. melanopsis* Nutt.  
Other common name(s): Sandbar Willow, Dusky Willow, Coyote Willow, Slender Willow  
Reference(s): ECI, GP, NW, RDT, VPM, WM  
Pronunciation: ek- (emphasis) ig- ('i' as in pin) ua ('u' as in mute, 'a' as in Persia)  
Ecological Zone(s): Foothills/ Valley, Plains  
Wetland status: facultative  
Remarks: Very variable, several subspecies and varieties, forms large colonies along streams and ditches.  
Taxonomic confusion with *S. melanopsis*. The two species overlap, both species form colonies not clumps, this is unique. See appendix C.

#### Vegetative Structures

Habit: medium to large shrub  
Height: 1.4 to 6 meters (5-20 ft.)  
Twigs: glabrous, red brown or brown  
Mature leaves:  
    Dorsal: glabrous or pubescent, silvery or gray green  
    Ventral: same  
    Margin: entire or finely toothed  
    Length: 3-15 cm  
    Width: 4-20 cm  
    Shape: lance linear to elliptic to lance-elliptic  
Stipules: minute or absent  
Remarks: These criteria can vary; rhizomatous, seldom higher than 4 meters.

#### Sexual Structures

Catkins, general  
    Emergence time: serotinous, coetaneous  
    Scale color: yellowish  
    Scale hair: more or less villous  
Catkins, staminate  
    Length: 1.5-6 cm  
    Width: —  
Catkins, pistillate  
    Length: 1.5-8 cm  
Capsules  
    Length: 4-8 mm  
    Other: glabrous or pubescent, ovoid  
Styles: .2 mm  
Stigmas: bilobed  
Stamens: 2  
Remarks: Flowers in May to June. This is the same drawing as for *S. melanopsis*, except for the pubescent pistil. Scales fall soon after blooming. Anthers yellow.



*Salix farriae* Ball  
Farr Willow

#### General

Synonyms: —  
Other common name(s): —  
Reference(s): ECI, NW, RDT,  
VPM, WM  
Pronunciation: far- ('a' as in far) e-  
('e' as in mete) a ('a' as in fate)  
Ecological Zone(s): Subalpine,  
Montane  
Wetland status: obligate  
Remarks: Common in the Pintlar  
and Sapphire Ranges; wet meadows

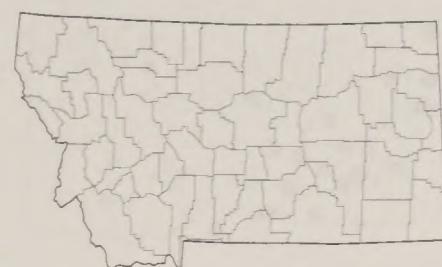
#### Vegetative Structures

Habit: low shrub  
Height: .2-1.5 meter (.5-5 ft.)  
Twigs: pubescent becoming  
glabrous, dull yellowish to reddish-  
brown; older are dull brown to  
reddish  
Mature leaves:  
    Dorsal: glabrous, dull, yellow-  
        green  
    Ventral: glaucous, pale  
Margin: entire  
Length: 3-6 cm  
Width: 10-20 mm  
Shape: elliptic to elliptic-obovate  
to lanceolate  
Stipules: small, deciduous  
Remarks: —

#### Sexual Structures

Catkins, general  
Emergence time: serotinous  
Scale color: dark brown to black  
Scale hair: thinly long pubescent to  
glabrous  
Catkins, staminate  
Length: 1-2 cm  
Width: slender  
Catkins, pistillate  
Length: 1-3 cm  
Capsules  
Length: 4-6 mm  
Other: glabrous, ovoid  
Styles: .4-.7 mm  
Stigmas: more or less bilobed  
Stamens: 2  
Remarks: Scales sometimes have a  
yellow base

Drawing courtesy of New York Botanical Garden. Map courtesy of Steve Chadde.



Introduced



*Salix fragilis* L.  
Crack Willow

**General**

Synonyms: —  
Other common name(s): Brittle Willow  
Reference(s): GP, VPM, WM  
Pronunciation: fraj- (emphasis) i- ('i' as in pin) lis  
Ecological Zone(s): Foothills/ Valley, Plains  
Wetland status: facultative  
Remarks: Exotic. Planted along water courses and at habitation (often abandoned). Escapes. Introduced from Europe in colonial times for shade, sentiment, ornament, and gunpowder.

**Vegetative Structures**

Habit: medium tree  
Height: to 20 meters (to 65 ft.)  
Twigs: spreading, green to reddish brown, glabrous  
Mature leaves:  
    Dorsal: glabrous, shiny yellow green  
    Ventral: glaucous  
Margin: coarsely glandular serrate  
Length: 7-13 cm  
Width: 10-30 mm  
Shape: lanceolate, to narrowly elliptic, acuminate; often asymmetric  
Stipules: well developed but caducous  
Remarks: Hybridizes with *S. babylonica* and *S. alba*, causing identification problems

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: yellowish  
Scale hair: pubescent, villous at tip  
Catkins, staminate  
Length: 4-8 cm  
Width: —  
Catkins, pistillate  
Length: 3-8 cm  
Capsules  
Length: 4.5-5 mm  
Other: glabrous, narrowly conic  
Styles: .2-.7 mm  
Stigmas: —  
Stamens: 2  
Remarks: Flowers in May

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



***Salix geyeriana* Anderss.**  
**Geyer Willow**

**General**

Synonyms: —  
Other common name(s): Bluestem Willow  
Reference(s): ECI, NW, RDT, VPM, WM  
Pronunciation: gey-er-e ('e' as in mete) -ana (emphasis, 'a' as in fate, 'a' as in Persia)  
Ecological Zone(s): Montane  
Wetland status: facultative  
Remarks: Often associated with *S. drummondiana* and *S. boothii*, along streams, in swamps, wet meadows, easy to confuse with *S. lemmmonii*

**Vegetative Structures**

Habit: medium to large shrub  
Height: 1.4-7 meters (5-23 ft.)  
Twigs: pruinose  
Mature leaves:  
    Dorsal: green, sericeous  
    Ventral: light green, sericeous  
    Margin: entire  
    Length: 3-8 cm  
    Width: 6-15 cm  
    Shape: elliptic to lance-elliptic  
Stipules: minute, caducous  
Remarks: Leaves with small tooth at apex

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: yellowish to red to tan to brown to black  
Scale hair: villous to puberulent  
Catkins, staminate  
Length: .7-1.5 cm  
Width: —  
Catkins, pistillate  
Length: 1-2.5 cm  
Capsules  
Length: 3-6 mm  
Other: thin, shortly pubescent  
Styles: .1-.4 mm, stout  
Stigmas: bilobed, .2-.4 mm  
Stamens: 2  
Remarks: Catkins on pubescent, leafy peduncles

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix glauca* L.  
Gray Willow

**General**

Synonyms: *S. glaucops* Andress.  
Other common name(s): —  
Reference(s): NW, VPM, WM  
Pronunciation: gla- (emphasis, 'a' as in fall) ka ('a' as in Persia)  
Ecological Zone(s): Montane, Subalpine  
Wetland status: facultative  
Remarks: Moist, often shaded locations

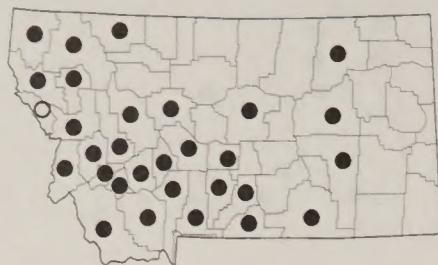
**Vegetative Structures**

Habit: low to medium shrub  
Height: .3-2 meters (1-3 ft.)  
Twigs: dark or reddish, villous, tomentose  
Mature leaves:  
Dorsal: villous-tomentose becoming glabrate  
Ventral: same, lighter in color  
Margin: entire  
Length: 1.5-7 cm  
Width: 8-20 mm  
Shape: narrowly elliptic to obovate  
Stipules: small, deciduous  
Remarks: Leaf hairs change with age

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: dark brown to black  
Scale hair: pubescent  
Catkins, staminate  
Length: 1.2-3 cm  
Width: —  
Catkins, pistillate  
Length: 1.5-5 cm  
Capsules  
Length: 4-8 mm  
Other: pubescent  
Styles: .4-.8 mm  
Stigmas: bilobed, shorter than style  
Stamens: 2  
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix lasiandra* Benth.  
Pacific Willow

#### General

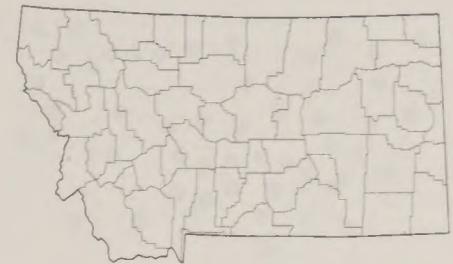
Synonyms: —  
Other common name(s): Whiplash Willow, Black Willow  
Reference(s): ECI, NW, RDT, VPM, WM  
Pronunciation: la- ('a' as in fate) se- ('e' as in mete) andra ('a' as in fat, 'a' as in Persia)  
Ecological Zone(s): Foothills/ Valley, Plains  
Wetland status: facultative  
Remarks: Along streams and ditches

#### Vegetative Structures

Habit: large shrub to small tree  
Height: 2-15 meters (6-50 ft.)  
Twigs: moderately to densely pubescent, become glabrous with age, yellow to reddish brown  
Mature leaves:  
Dorsal: finely pubescent, becoming glabrous  
Ventral: same  
Margin: very finely serrate  
Length: 4-15 cm  
Width: 8-30 mm  
Shape: narrowly elliptic to lanceolate, long, acuminate  
Stipules: well developed, foliaceous, sooner or later deciduous  
Remarks: Two or more large glands on petiole at base, rarely higher than 6 meters

#### Sexual Structures

Catkins, general  
Emergence time: coetaneous  
Scale color: yellow, green or whitish  
Scale hair: pubescent  
Catkins, staminate  
Length: 2-7 cm, stout  
Width: 15 mm  
Catkins, pistillate  
Length: 2-12 cm  
Capsules  
Length: 4-7 mm  
Other: glabrous  
Styles: .5-1 mm  
Stigmas: .5 mm, blunt  
Stamens: 3-8  
Remarks: Normally has 5 stamens, scales fall soon after bloom



Location not known



*Salix lemmontii* Bebb.  
Lemmon Willow

**General**

Synonyms: *S. austinae* Bebb.  
Other Common Names: —  
Pronunciation: lem-mon- (emphasis, 'o' as in note) -e ('e' as in mete) -i ('i' as in pine)  
Ecological Zone(s): Montane, Subalpine  
Wetland status: facultative  
Remarks: May not be in Montana, no map available, very like *S. geyeriana* and *S. drummondiana*, streambanks, relatively dry portion of riparian zone, higher elevation than *S. geyeriana*

**Vegetative Structures**

Habit: shrub  
Height: 1-3 meters (3-10 ft.)  
Twigs: glabrous to sparsely pubescent, becoming strongly glaucus, chestnut red to purplish red.  
Mature leaves:  
Dorsal: shiny green, very finely pubescent to glabrous  
Ventral: pale glaucus, finely pubescent  
Margin: Entire to serrulate  
Length: 3-8 cm  
Width: 6-15 mm  
Shape: lance-elliptic  
Stipules: minute, inconspicuous  
Remarks: Leaves slightly appressed reddish hairy when unfolding, soon mostly glabrous; numerous slender, crooked stems; loose basal cluster

**Sexual Structures**

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: brown to black  
Scale hair: long pubescent  
Catkins, staminate  
Length: 1—3.5 cm  
Width: —  
Catkins, pistillate  
Length: 1-5 cm  
Capsules:  
Length: —  
Other: pubescent  
Styles: .2-.9 mm  
Stigmas: less than 0.5 mm  
Stamens: 2  
Remarks: —



*Salix lutea* Nutt.  
Yellow Willow

**General**

Synonyms:  
Other common name(s): Mackenzie Willow  
Reference(s): CP, ECI, CP, RDT, VPM, NW  
Pronunciation: lu- (emphasis, 'u' as in mute) te- ('e' as in mete) a ('a' as in Persia)  
Ecological Zone(s): Foothills/ Valley, Plains  
Wetland status: facultative  
Remarks: Called *S. rigida* var. *watsonii* (Bebb) Cronq in NW; this is a misapplied name, *not* synonymy. (see Appendix C)

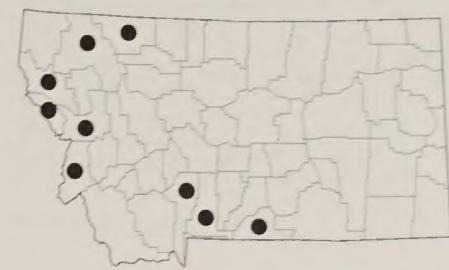
**Vegetative Structures**

Habit: medium to large shrub, small tree  
Height: 3-8 meters (10-26 ft.)  
Twigs: young are usually distinctly yellowish, older are silvery gray  
Mature leaves:  
Dorsal: glabrous, dark green to yellow green  
Ventral: pale, usually glaucous  
Margin: serrulate to entire  
Length: 3-12 cm  
Width: 10-40 mm  
Shape: broadly elliptic to lanceolate to oblanceolate, acuminate  
Stipules: well developed, foliaceous, sooner or later deciduous  
Remarks: Bark yellowish gray

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous to precocious  
Scale color: light brown to black to blackish red  
Scale hair: pubescent  
Catkins, staminate  
Length: up to 5 cm  
Width: —  
Catkins, pistillate  
Length: 2-8 cm  
Capsules  
Length: 4-7 mm  
Other: glabrous, ovoid  
Styles: .3-.7 mm  
Stigmas: 2 lobed  
Stamens: 2  
Remarks: Flowers in April to early May

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix melanopsis*  
(Mountain) Streambank Willow

**General**

Synonyms: —  
Other common name(s): Sandbar Willow, Dusky Willow, Coyote Willow, Slender Willow  
Reference(s): ECI, NW, VPM  
Pronunciation: mel- ('e' as in mete) an-op- ('o' as in note) -sis (emphasis)  
Ecological Zone(s): Montane  
Wetland status: obligate  
Remarks: Treated as a subspecies of *S. exigua* in ECI, much taxonomic confusion with *S. exigua*. The species overlap; both species form colonies, not clumps, this is unique. See appendix C.

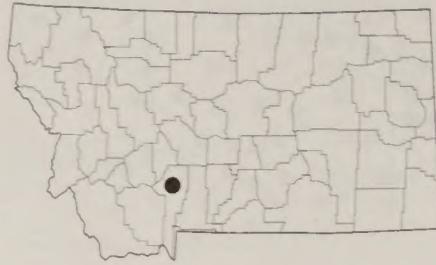
**Vegetative Structures**

Habit: medium to large shrub  
Height: 1.5-8 meters (5-25 ft.)  
Twigs: glabrous, red or brown  
Mature leaves:  
    Dorsal: green  
    Ventral: glaucous, glabrous  
    Margin: somewhat toothed  
    Length: 3-6 cm  
    Width: 5-15 mm  
    Shape: linear to elliptic  
Stipules: minute to glabrous  
Remarks: —

**Sexual Structures**

Catkins, general  
    Emergence time: serotinous to coetaneous  
    Scale color: yellowish  
    Scale hair: completely glabrous to pubescent at base  
Catkins, staminate  
    Length: 1.5-6 cm  
    Width: —  
Catkins, pistillate  
    Length: 1.5-8 cm  
Capsules  
    Length: 4-8 mm  
    Other: glabrous, ovoid  
    Styles: .5-1 mm  
    Stigmas: bilobed  
    Stamens: 2  
Remarks: Note glabrous pistil in the drawing—otherwise the drawing is the same as *S. exigua*

Drawing courtesy of University of Washington Press. Map courtesy of Robert Dorn.



*Salix monochroma* Ball  
One Colored Willow

**General**

Synonyms:  
Other common name(s):  
MacKenzie Willow  
Reference(s): NW, VPM  
Pronunciation: mono- (emphasis)  
chrom-a ('a' as in Persia)  
Ecological Zone(s): Foothills/Valley  
Wetland status: facultative  
Remarks: Called *S. rigida* var.  
*mackenzieana* (Hook) Cronq. in  
NW. See Appendix C, Wet meadows  
and streambanks, ditch banks.  
See appendix C.

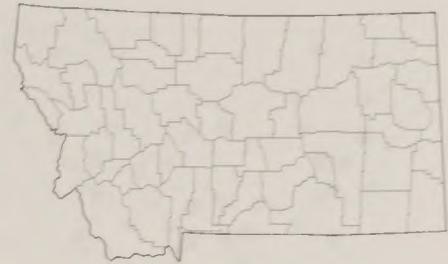
**Vegetative Structures**

Habit: Coarse shrub, medium to large  
Height: 1-9 meters (3-30 ft.)  
Twigs: reddish-brown, not yellow  
Mature leaves:  
    Dorsal: green, usually glabrous  
    Ventral: glaucus  
    Margin: finely toothed  
    Length: 5-15 cm  
    Width: 10-30 mm  
    Shape: lanceolate to elliptic,  
        acute  
Stipules: to 10 mm, foliaceous,  
        inconspicuous on older branches  
Remarks: Leaves thin, somewhat  
translucent

**Sexual Structures**

Catkins, general  
    Emergence time: precocious to  
        coetaneous  
    Scale color: light brown to blackish  
    Scale hair: glabrous, axis wooly  
Catkins, staminate  
    Length: up to 5 cm  
    Width: 10-15 mm  
Catkins, pistillate  
    Length: 3-9 cm  
Capsules  
    Length: 3-7 mm  
    Other: glabrous  
Styles: .2-.7 mm  
Stigmas: often scarcely bilobed  
Stamens: 2  
Remarks: —

Drawing courtesy of New York Botanical Garden. Map courtesy of Robert Dorn.



Location not known



*Salix petiolaris* J.E. Sm.  
Meadow Willow

#### General

Synonyms: —  
Other common name(s): Basket Willow  
Reference(s): CP, GP, VPM  
Pronunciation: pet-e- ('e' as in mete) o- ('o' as note) la- (emphasis, 'a' as in fare) ris  
Ecological Zone(s): Plains  
Wetland status: facultative  
Remarks: Reported in Montana, apparently not confirmed.

#### Vegetative Structures

Habit: clump to few stemmed tree, medium height  
Height: 1-7 meters (3-23 ft.)  
Twigs: slender, puberulent, yellowish to dark brown or reddish brown (glabrous)  
Mature leaves:  
    Dorsal: pubescent becoming glabrous, dark green  
    Ventral: glaucous  
Margin: usually sharply serrate, sometimes entire,  
Length: 1.5-15 cm  
Width: 8-30 mm  
Shape: narrowly lanceolate to narrowly oblanceolate, acute to acuminate  
Stipules: absent  
Remarks: leaf hairs change with age

#### Sexual Structures

Catkins, general  
Emergence time: coetaneous  
Scale color: brown  
Scale hair: villous  
Catkins, staminate  
Length: 1-5 cm  
Width: 2-2.5 cm  
Catkins, pistillate  
Length: —  
Capsules  
Length: 5-7 mm  
Other: pubescent, conic or lanceolate-rostrate  
Styles: .1-.3 mm, entire or divided  
Stigmas: —  
Stamens: 2  
Remarks: Flowers in May

Drawing courtesy of New York Botanical Garden.



### *Salix planifolia* Pursh Planeleafed Willow

#### General

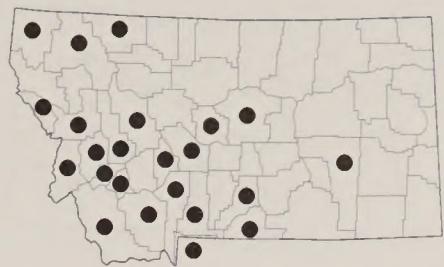
Synonyms:  
Other common name(s): Tealeaf Willow  
Reference(s): ECI, GP, RDT, VPM, WM  
Pronunciation: plan- (emphasis) i- ('i' as in pin) fol- ('o' as in note) ia ('i' as in pine, 'a' as in Persia)  
Ecological Zone(s): var. *monica*- Alpine, Subalpine; var. *planifolia*- Subalpine, Montane  
Wetland status: see below  
Remarks: Var. *monica* (Bebb) Jeps. is a low shrub; obligate wetland; - Var. *planifolia* Pursh is a medium shrub to shrubby tree, facultative wetland; forms dense thickets; common in the Beartooths, misnamed *S. phylicifolia* L., this is a mistake  
*not* synonymy.

#### Vegetative Structures

Habit: see general  
Height: .4-1 meter (1-3 ft.) var. *monica*, 2-4 meters (6-13 ft.) var. *planifolia*  
Twigs: shiny, purplish to red to chestnut, divaricate, puberulent to glabrous  
Mature leaves:  
Dorsal: initially pubescent, then glabrous, dark green and glossy  
Ventral: glaucous  
Margin: usually entire to serrate  
Length: 3-8 cm  
Width: 12-35 mm  
Shape: elliptic to oblanceolate to lanceolate  
Stipules: minute, deciduous  
Remarks: Var. *monica* leaves often broader than those of Var. *planifolia*, leaves have evident, parallel veins

#### Sexual Structures

Catkins, general  
Emergence time: precious to coetaneous  
Scale color: black  
Scale hair: villous  
Catkins, staminate  
Length: 1-4 cm  
Width: —  
Catkins, pistillate  
Length: 1.5-6 cm  
Capsules:  
Length: 4-8 mm  
Other: pubescent, ovoid, beaked, long necked  
Styles: .4-1.5 mm, entire  
Stigmas: .3-.7 mm  
Stamens: 2  
Remarks: Flowers in May



***Salix pseudomonticola* Ball  
Serviceberry Willow**

**General**

Synonyms: *S. monticola* Bebb.  
Other common name(s): Mountain Willow, False Mountain Willow  
Reference(s): CP, ECI, GP, NW, VPM, WM  
Pronunciation: so- ('o' as in move) do- ('o' as in note) mon- (emphasis) tic- ('i' as in pin) ola ('o' as in note, 'a' as in Persia)  
Ecological Zone(s): Subalpine, Montane  
Wetland status: obligate  
Remarks: Called *S. monticola* in NW, WM; along streams and in swamps, wet meadows, sometimes at canyon mouths. Hard to distinguish from *S. barclayi*.

**Vegetative Structures**

Habit: medium shrub  
Height: 1.5-6 meters (5-20 ft.)  
Twigs: pubescent to glabrous, yellowish to reddish, second year dark red  
Mature leaves:  
Dorsal: glabrous, dull green  
Ventral: lighter than dorsal, glaucous  
Margin: irregularly serrate to entire  
Length: 3-8 cm  
Width: 12-35 mm  
Shape: ovate to obovate to elliptic  
Stipules: persistent, ovate, 5-15 mm long  
Remarks: Leaves red tipped when expanding, strongly veined, leaf midrib, petioles often red

**Sexual Structures**

Catkins, general  
Emergence time: precocious  
Scale color: dark brown to black  
Scale hair: long villous  
Catkins, staminate  
Length: 2-7 cm  
Width: —  
Catkins, pistillate  
Length: 1-9 cm  
Capsules  
Length: 5-8 mm  
Other: glabrous, ovoid  
Styles: .5-1.8 mm  
Stigmas: —  
Stamens: 2  
Remarks: Flowers in May; catkins sessile

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



Introduced



*Salix pendenra* L.  
Laurel Willow

**General**

Synonyms: —  
Other Common Names: —  
Pronunciation: Pen- (emphasis) den- tra ('a' as in Persia)  
Ecological Zone(s): Plains, Foot- hills/Valley  
Wetland Status: facultative  
Remarks: Exotic, escapes not known

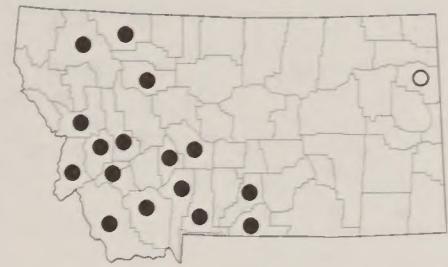
**Vegetative Structures**

Habit: tree  
Height: to 20 mm (66 ft.)  
Twigs: —  
Mature leaves:  
Dorsal: dark green, shiny  
Ventral: pale  
Margin: toothed  
Length: 3.5-10 cm  
Width: 15 to 40 mm  
Shape: broadly lanceolate to ovate  
Stipules: —  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: serotinous  
Scale color:  
Scale hair:  
Catkins, staminate  
Length: 2-5 cm  
Width:  
Catkins, pistillate  
Length: 2-6 cm  
Capsules  
Length:  
Other: glabrous  
Styles: less than .8 mm  
Stigmas: —  
Stamens: 5  
Remarks: Female catkins peduncled

Drawing courtesy of Robert Allen



*Salix reticulata* L.  
Snow Willow

**General**

Synonyms: *S. nivalis* Hook.  
Other common name(s): Creeping Willow  
Reference(s): ECI, NW, VPM, WM  
Pronunciation: re-tik-u- ('u' as in mute) la- (emphasis, 'a' as in fate) ta ('a' as in Persia)  
Wetland status: facultative  
Ecological Zone(s): Alpine  
Remarks: Called *S. nivalis* in ECI, NW. Ours is ssp. *nivalis* (Hook) Love et al.

**Vegetative Structures**

Habit: low creeping shrub  
Height: to 8 cm (3.5 in.)  
Twigs: glabrous, sparsely hairy below catkins.  
Mature leaves:  
Dorsal: long silky hairs, soon deciduous, dark green  
Ventral: pale glaucous  
Margin: entire  
Length: 1 to 3.5 cm  
Width: 5 to 20 mm  
Shape: elliptic to ovate to suborbicular  
Stipules: minute, caducous  
Remarks: Mat forming above treeline, leaves rounded, plants have rhizome-like stems

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous to serotinous  
Scale color: pale green to yellow  
Scale hair: glabrous to finely hairy  
Catkins, staminate  
Length: .4-2 cm  
Width: very slender  
Catkins, pistillate  
Length: .5-2 cm  
Capsules  
Length: —  
Other: pubescent, subsessile  
Styles: .1-.2 mm  
Stigmas: —  
Stamens: 2  
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix rotundifolia* Trautv.  
Dodge Willow

**General**

Synonyms: *S. dodgeana* Rydb.  
Other common name(s): Creeping Willow  
Reference(s): NW, VPM, WM  
Pronunciation: ro- ('o' as in note) tun-di- ('i' as in pin) fol- (emphasis, 'o' as in note) li-us  
Ecological Zone(s): Alpine  
Wetland status: facultative  
Remarks: Called *S. dodgiana* in NW, ours is called var. *dodgeana* (Rybd.) Argus. Found in moist alpine situations on limestone

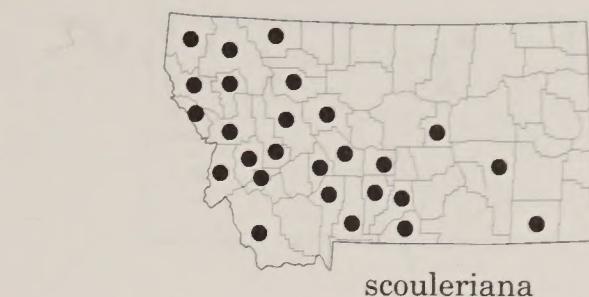
**Vegetative Structures**

Habit: low creeping shrub  
Height: to 8 cm (3.5 in.)  
Twigs: —  
Mature leaves:  
    Dorsal: glabrous, firm, glossy green  
    Ventral: same  
Margin: entire, ciliate  
Length: .3-.9 cm  
Width: 2-5 mm  
Shape: elliptic to oval to suborbicular  
Stipules: —  
Remarks: Mat forming above treeline, old leaves persist, leaves are very small and firm. Plant rhizomatous.

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous  
Scale color: purplish  
Scale hair: mostly glabrous  
Catkins, staminate  
Length: very short  
Width: usually have only 3-4 flowers  
Catkins, pistillate  
Length: very short, 2-9 flowers  
Capsules  
Length: 3.5-4.5 mm  
Other: glabrous, ovoid  
Styles: .2-.8 mm  
Stigmas: bilobed, .5-1 mm  
Stamens: 2  
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*scouleriana*

***Salix scouleriana* Barr  
Scouler Willow**

**General**

Synonyms: —  
Other common name(s): Fire Willow  
Reference(s): ECI, GP, NW, VPM, WM  
Pronunciation: sco- ('o' as in note) ler-e- ('e' as in mete) ana ('a' as in fate, 'a' as in Persia)  
Ecological Zone(s): Foothills/ Valley, Montane  
Wetland status: relatively dry sites  
Remarks: Often found in cut over, burned over or avalanche areas

**Vegetative Structures**

Habit: usually a shrub, sometimes a medium tree  
Height: 3-15 meters (10-50 ft.)  
Twigs: pubescent (sometimes velvety) to glabrous, older yellowish to reddish brown  
Mature leaves:  
    Dorsal: pubescent to glabrous, dull green  
    Ventral: glaucous, usually finely pubescent, veiny  
Margin: crenate, serrate  
Length: 2-9 cm  
Width: 10-40 mm  
Shape: oblanceolate to ovate to obovate  
Stipules: variable shape, deciduous  
Remarks: "Skunkey" odor when bark from twigs of the previous year is stripped, often found in shade, leaves thickish.

**Sexual Structures**

Catkins, general  
Emergence time: coetaneous or precocious  
Scale color: blackish  
Scale hair: long pubescent  
Catkins, staminate  
Length: 2-4 cm  
Width: —  
Catkins, pistillate  
Length: —  
Capsules  
Length: 2.5-8 mm  
Other: densely pubescent, beaked, ovoid  
Styles: .4-.8 mm  
Stigmas: bilobed, .5-1 mm  
Stamens: 2  
Remarks: Flowers in May



*Salix serissima* (Bailey) Fern.  
Autumn Willow

**General**

Synonyms: —  
Other common name(s): —  
Reference(s): GP  
Pronunciation: ser- (emphasis) ris- ('i' as in pin) im- ('i' as in pin) ma ('a' as in Persia)  
Ecological Zone(s): Foothills/Valley  
Wetland status: facultative  
Remarks: Considered sensitive in MT by The Nature Conservancy, extremely rare in MT, probably secure globally. Swamps and streams sites. Wet organic soils.

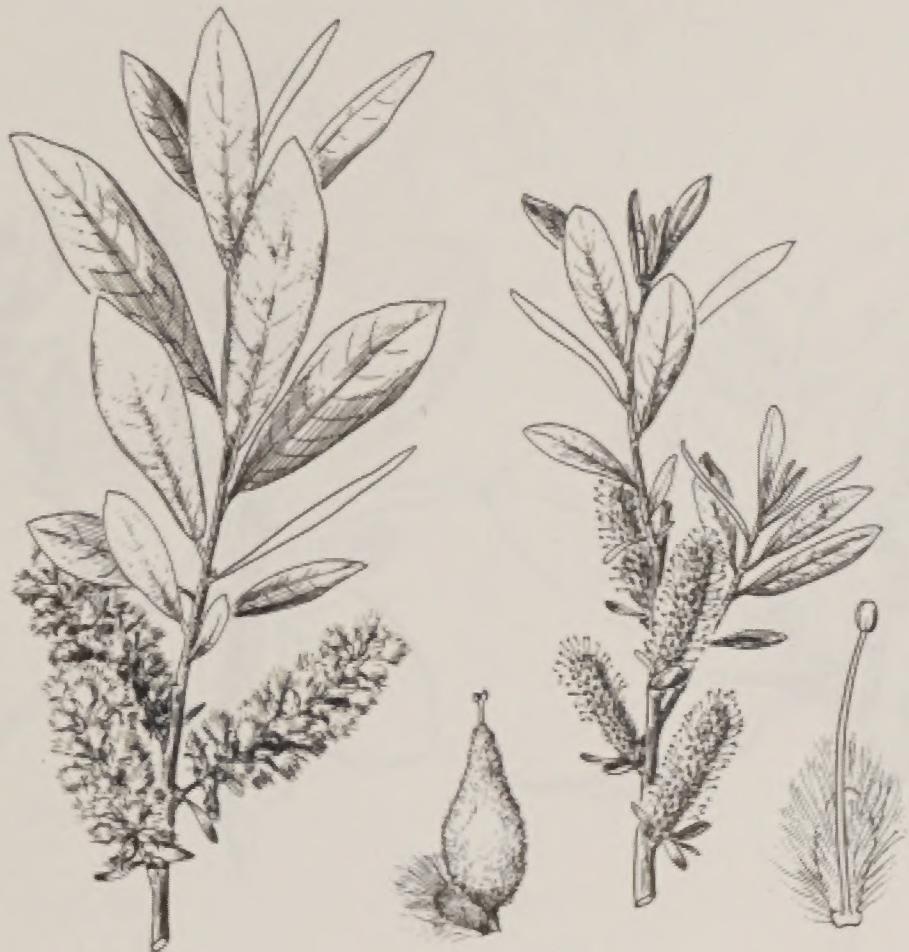
**Vegetative Structures**

Habit: medium shrub  
Height: to 4 meters (to 13 ft.)  
Twigs: yellowish-brown, glabrous, shining  
Mature leaves:  
    Dorsal: glabrous, shining yellowish green to green  
    Ventral: pale  
    Margin: finely glandular-serrulate  
Length: 4-10 cm  
Width: 10-35 mm  
Shape: elliptic to lanceolate to oblong-lanceolate  
Stipules: rarely present  
Remarks: Bark silvery, branches olive brown, plants rarely over 2 meters.

**Sexual Structures**

Catkins, general  
Emergence time: serotinous, appear in mid to late summer  
Scale color: light yellow  
Scale hair: pubescent  
Catkins, staminate  
Length: 1-4 cm  
Width: —  
Catkins, pistillate  
Length: 1.5-3 cm  
Width: to 20 mm  
Capsules  
Length: 7-12 mm  
Other: glabrous, ovoid, olive brown, cartilaginous  
Styles: —  
Stigmas: short, divided  
Stamens: 3-5+  
Remarks: Catkins unique in the fact that they appear so late

Drawing courtesy of New York Botanical Garden. Map courtesy of Steve Chadde.



*Salix sitchensis* Sanson  
Sitka Willow

**General**

Synonyms: *S. coulteri* Andress.  
Other Common Name(s): —  
References: NW, VPM, WM  
Pronunciation: sit- (emphasis) ka- ('a' as in Persia) en-sis  
Ecological Zone(s): Montane  
Wetland status: facultative  
Remarks: Along streams and in moist woods, may hybridize with *S. drummondiana*, especially when male plants are absent.

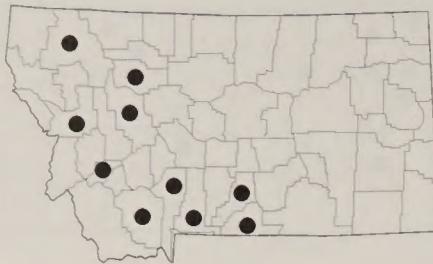
**Vegetative Structures**

Habit: shrub  
Height: 2-7 meters (6-23 ft.)  
Twigs: velvety-puberulent to velvety tomentose, yellowish brown becoming grayish  
Mature leaves:  
Dorsal: sparsely gray pubescent to glabrous, green  
Ventral: silvery pubescent, less green  
Margin: entire, callous glands on margin  
Length: 4-9 cm  
Width: 15-35 mm  
Shape: obovate to oblanceolate to elliptic to lanceolate  
Stipules: small to caducous to well developed, persistent  
Remarks: Bark smooth, gray

**Sexual Structures**

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: light brown to blackish  
Scale hair: long pubescent  
Catkins, staminate  
Length: 2.5-5 cm  
Width: —  
Catkins, pistillate  
Length: 3-9 cm  
Capsules:  
Length: densely pubescent  
Other: —  
Styles: .3-.8 mm  
Stigmas: .2-.3  
Stamens: 1  
Remarks: Single stamen is unique, formed by the fusion of two stamens

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde.



*Salix tweedyi* Bebb. ex. Rose) Ball  
Tweedy Willow

**General**

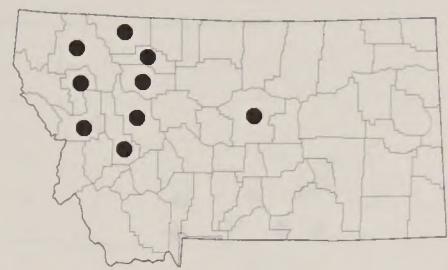
Synonyms: *S. barratianna* Hook var. *tweedyi* (Bebb.)  
Other common name(s): —  
Reference(s): ECI, NW  
Pronunciation: tweed- (emphasis) e- ('e' as in mete) i ('i' as in pie)  
Ecological Zone(s):  
Wetland status: facultative  
Remarks: —

**Vegetative Structures**

Habit: large shrub  
Height: to 4.5 meters (15 ft.)  
Twigs: stout, long spreading pubescent  
Mature leaves:  
    Dorsal: long, spreading pubescent to glabrate  
    Ventral: essentially glabrous, slightly paler than dorsal, not glaucous  
Margin: finely glandular serrulate to subentire  
Length: 4-9 cm  
Width: 20-50 mm  
Shape: elliptic to elliptic-ovate to obovate  
Stipules: well developed, foliaceous, 5-12 mm  
Remarks: —

**Sexual Structures**

Catkins, general  
Emergence time: precocious to coetaneous  
Scale color: blackish  
Scale hair: long pilose  
Catkins, staminate  
Length: 2-4 cm  
Width: 15-20 mm  
Catkins, pistillate  
Length: 2-8 cm  
Capsules  
Length: 4.5-7 mm  
Other: usually glabrous  
Styles: 1-3 mm  
Stigmas: —  
Stamens: 2  
Remarks: —



***Salix vestita* Pursh  
Rock Willow**

**General**

Synonyms: —  
Other common name(s): —  
Reference(s): NW, VPM, WM  
Pronunciation: ves-te- (emphasis, 'e' as in mete) ta ('a' as in Persia)  
Ecological Zone(s): —  
Wetland status: facultative  
Remarks: Moist stoney soil or moist rock outcrops, may be more common on wet organic soil

**Vegetative Structures**

Habit: medium to large shrub  
Height: 1-10 meters (3-34 ft.)  
Twigs: pubescent  
Mature leaves:  
    Dorsal: soon glabrous, dark green  
    Ventral: glaucous, silvery villous becoming glabrous  
    Margin: slightly revolute, very small gland teeth  
    Length: 2-9 cm  
    Width: 10-50 mm  
    Shape: elliptic-obovate to elliptic-ovate to suborbicular  
Stipules: absent  
Remarks: Leaf hair changes with age, plant can be distinguished by its leathery leaves with distinct veination

**Sexual Structures**

Catkins, general  
    Emergence time: serotinous  
    Scale color: brown  
    Scale hair: villous  
Catkins, staminate  
    Length: 1.5-3 cm  
    Width: 5 mm  
Catkins, pistillate  
    Length: 1-5 cm  
Capsules  
    Length: 2-5 mm  
    Other: villous, ovoid  
Styles: short or lacking  
Stigmas: bilobed  
Stamens: 2  
Remarks: —

Drawing courtesy of University of Washington Press. Map courtesy of Steve Chadde and Robert Dorn.



*Salix wolfii* Bebb  
Wolf Willow

#### General

Synonyms: —  
Other common name(s): —  
Reference(s): ECI, VPM, WM  
Pronunciation: wolf- (emphasis) e ('e' as in mete) i ('i' s in pine)  
Ecological Zone(s): Subalpine, Montane  
Wetland status: facultative  
Remarks: Swamps, wet meadows, bogs, occasionally along streams.  
Wet organic soils. Var. *idahoensis* Ball is common; var. *wolfii* is considered sensitive by The Nature Conservancy, extremely rare in MT, apparently globally secure.

#### Vegetative Structures

Habit: medium to small shrub  
Height: .6-2 meters (2-7 ft.)  
Twigs: first year-thinly villous, puberulent  
Mature leaves:  
    Dorsal: silvery-pubescent, gray green  
    Ventral: same  
    Margin: entire  
    Length: 2-6 cm  
    Width: 7-20 mm  
    Shape: elliptic to ovate to oblanceolate  
Stipules: foliaceous, 1-7 mm, sooner or later deciduous  
Remarks: 6+ feet high only when not grazed, leaf veins inconspicuous

#### Sexual Structures

Catkins, general  
Emergence time: coetaneous  
Scale color: dark brown to blackish  
Scale hair: wooly villous  
Catkins, staminate  
    Length: .8-2 cm  
    Width: less than 10 mm  
Catkins, pistillate  
    Length: .8-4 cm  
Capsules  
    Length: 3.5-5 mm  
Other: var. *idahoensis* villous; var *wolfii*, glabrous  
Styles: .5-1.1 mm  
Stigmas: bilobed  
Stamens: 2  
Remarks: —

Drawing courtesy of New York Botanical Garden. Map courtesy of Steve Chadde, Lesica and Shelly (1991)

## A Glossary Designed Especially for Use in Willow (Salix) Identification

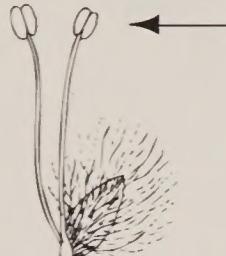
Acuminate - Refers to a kind of leaf tip: long, gradually tapering to a sharp point.



Acute - Refers to a kind of leaf tip: ending quickly in a sharp point.



Ament - Syn. catkin; cluster of unisexual flowers; dense, elongate.



Appressed - Lying close to and flattened to the surface.

Axis - Main longitudinal (right angle to horizontal) support structure in a catkin from which flowers arise.

Bicarpellate - Having two carpels.



Bilobed - Two lobed, cleft.



Bract - Modified, reduced leaf; located just above a catkin on a branchlet. Not to be confused with scales (floral bracts) which are part of the catkin. Some works refer to scales as bracts.

Caducous - Falling off early in the yearly development of a plant.

Callous, Callus - Tissue that forms over a cut or damaged plant surface.

Calyx - The outer group of floral leaves (petals).

Capsule - A dry fruit; opening by slits or valves, has more than one seed bearing unit.

Carpel - Ovule bearing part of a pistil.

Cartilaginous - Resembling the consistency of cartilage.

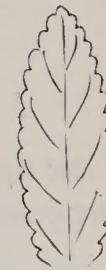


Catkin - Syn. ament (see above).

Ciliate - Refers to leaf edge: fringed with hairs.

Coetaneous - Refers to catkins: appear at the same or about the same time as the leaves open.

Conic - Cone shaped.



Crenate - Refers to a leaf margin: toothed, shallow rounded teeth, "scalloped."

Deciduous - Falling off after completion of its function.

Divaricate - Widely divergent, forked.

Dorsal - The top side (of a leaf) under normal field circumstances.



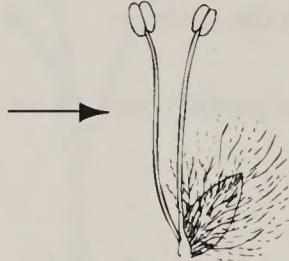
Elliptic - Refers to leaf, etc., shape: widest in the middle, tapering equally to both ends (which are often rounded); shaped like an ellipse.



Entire - Refers to the edge of a leaf, etc.: without teeth or glands, completely smooth.

Facultative - Optional, not absolutely required.

Filament - Thread like stalk which supports the anther.



Foliaceous - Leaf like.

Floral Bract - See scale.

Glabrous - Without glands or hairs, not pubescent.

Glabrate - Nearly glabrous or becoming glabrous.

Glacous - Covered with a whitish, waxy layer which rubs off easily.

Glutinous - Having a sticky or slimy surface.

Hydric - Refers to soil: has an abundant supply of water.

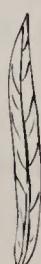
Krumholtz - A growth form found in alpine situations (above the timberline).

Trees that would normally be straight and tall that are stunted, shrubby, and low, often 1 meter or less high.

Lanceolate - Refers to leaf shape: spear (lance) shaped with the widest part near the base.



Locally Common - Found only in certain places (locales), but common when found.



Linear - Refers to leaf, etc., shape; long and narrow with parallel edges.

Mesic - Refers to soil: moist, but water is not abundant (not hydric).

Oblanceolate - Refers to leaf shape:  
spear shaped with the widest  
part near the tip.



Obligate - Required.

Obovate - Refers to the leaf shape: egg shaped with the narrow part near the base.



Obsolete - Wearing out or disappearing, i.e., a calyx  
united with the ovary or reduced to a rim.



Ovary - The part of the pistil that becomes the fruit. →

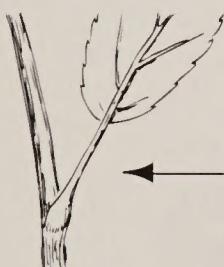


Ovate - Refers to leaf shape:  
egg shaped with wider  
part near the base.

Ovoid - Refers to capsule: egg shaped with wider part near base.

Peduncle - A stem or stalk which supports the flower or fruit.

Pendulous - Hanging down.



Petiole - Leaf stalk.

Phreatophytic - Possessing deep roots which take water from the water table.

Pilous - Covered with soft, distinct, thin hairs.



Pistil - Female part of a flower, differentiated into ovary, style, and stigma.



Pistillate - Refers to female catkins;  
catkins that have female parts.

Precocious - Refers to catkins: appearing before the leaves open.

Pruinose - Having a waxy, powdery secretion on the surface; purplish bloom, "blue-stem willows."

Puberulent - Having tiny, barely visible hairs.

Pubescent - Having any kind of hair: i.e., pilous, puberulent, tomentose, villous, etc.

Pyric Disclimax - Disclimax resulting from repeated fire, fire disturbance climax, stage in plant succession replacing or modifying true climax because of fire.

Reticulate - Refers to leaf venation: like a network, has many interconnections.

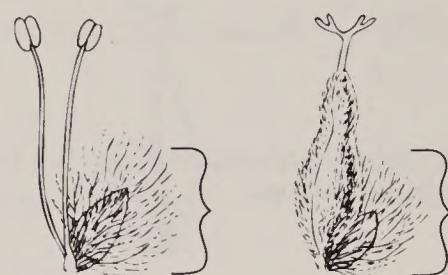
Revolute - Refers to leaf margins: rolled toward the ventral side.

Rostrate - Beaked.

Rugous - Wrinkled.

Scale - Syn. floral bract. A nongreen bract associated with each flower of a catkin.

Some works refer to scales as bracts.



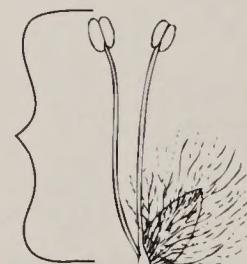
Sericous - With many long, straight, soft appressed hairs giving a silky appearance.

Serotinous - Refers to catkins: appearing after the leaves.



Serrate - Refers to leaf edge; finely toothed.

Sessile - Sitting directly on base without a supporting stalk, petiole, or peduncle.



Stamen - Male part of a flower, divided into the anther and a filament.



Staminate - Refers to catkins: catkins that have male parts .

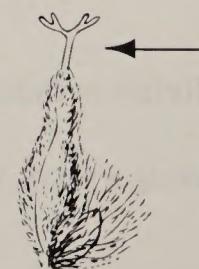


Stigma - The top part of the pistil. Receives the pollen.

Stipe - Syn. peduncle; the stalk that bears the pistil or fruit.



Stipule - A paired appendage found at the base of a petiole.



Style - The part of the pistil which separates the stigma from the ovary. Usually elongated.

Superior - Refers to ovary; ovary placed above the sepals.

Synonymy - Replaced by another name.

Timberline - Transition zone from forest to alpine meadows and/or rockland.

Tomentose - Covered with tangled, matted, wooly hairs.

Twig of the year (season).

Twig of the previous year.

Twig in its third season of growth.

Ventral - The bottomside (of a leaf) under normal field conditions.

Villous (Villose) - Having long, soft hairs that are not matted.



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## APPENDIX A

### Index of Preferred Common Names

- Alpine Willow - *S. arctica*
- Autumn Willow - *S. serissima*
- Barclay Willow - *S. barclayi*
- Barrett Willow - *S. barrattiana*
- Bebb Willow - *S. bebbiana*
- Booth Willow - *S. boothii*
- Cascade Willow - *S. cascadensis*
- Crack Willow - *S. fragilis*
- Dodge Willow - *S. rotundifolia*
- Drummond Willow - *S. drummondiana*
- Eastwood Willow - *S. eastwoodiae*
- Farr Willow - *S. farriae*
- Geyer Willow - *S. geyeriana*
- Gray Willow - *S. glauca*
- Hoary Willow - *S. candida*
- Laurel Willow - *S. pendantra*
- Lemmon Willow - *S. lemmontii*
- Meadow Willow - *S. petiolaris*
- Mountain Streambank Willow - *S. melanopsis*
- One Colored Willow - *S. monochroma*
- Pacific Willow - *S. lasiandra*
- Peachleaf Willow - *S. amygdaloidea*
- Plane Leafed Willow - *S. planifolia*
- Pussy Willow - *S. discolor*
- Rock willow - *S. vestita*
- Scouler Willow - *S. scouleriana*
- Serviceberry Willow - *S. pseudomonticola*
- Sitka Willow - *S. sitchensis*
- Short Fruited Willow - *S. brachycarpa*
- Snow Willow - *S. reticulata*
- Streambank Willow - *S. exigua*
- Tweedy Willow - *S. tweedyi*
- Undergreen Willow - *S. commutata*
- Yellow Willow - *S. lutea*
- Weeping Willow - *S. babylonica*
- White Willow - *S. alba*
- Wolf Willow - *S. wolfii*



## **APPENDIX B**

### **Range Maps**

The maps were prepared independently by Steve Chadde, USDA, Forest Service (RAWE), Missoula, Montana, and Robert Dorn, Mountain West Environmental Services, Cheyenne, Wyoming. Between the two sources, we were able to get maps for most willow species in Montana. Lesica and Shelley (1991) provided information that enabled us to make maps for the species considered sensitive by The Nature Conservancy (Barrat Willow, Cascade Willow, Autumn Willow, and a variety of Wolf Willow). Therefore, we have maps for all species except for exotic species and those that we are not completely certain are in Montana—Lemmon Willow and Meadow Willow.

We have not included maps for the exotic species—White Willow, Weeping Willow, Laurel Willow, and Crack Willow because they may have been planted anywhere there is or was human habitation. Maps would have told little of their tolerances and where they might be encountered in the wild.

Species which have been verified in or reliably reported in a given county are denoted by a solid black disk in that county on the map. An unverified report is denoted by an open circle. Wolf Willow, variety *idahoensis*, the common taxon, is denoted by a disk.



## APPENDIX C

### Ongoing Taxonomic Work With the Genus *Salix*

Diamond or Missouri Willow (*S. eriocephala* Michx.), Yellow Willow (*S. lutea* Nutt.), One Colored Willow (*S. monochroma* Ball), Mackenzie Willow (*S. rigida* var. *mackenzieana* (Hook) Cronq.), *S. mackenzieana* (authority unknown), *S. prolixa* (authority unknown), and other taxa are very similar and have caused considerable confusion. Robert Dorn is presently working with the group but is not yet completed. He feels that they may all be a single species, and if so, all taxons of the group must be called *S. eriocephala* (the oldest name).

Streambank Willow (*S. exigua*) and Mountain Streambank Willow (*S. melanopsis*) have also caused problems. The two species overlap and may hybridize. Steven Burnsfeld is working on this group.

For the sake of consistency, we will continue to use the species that Dr. Dorn has in his two excellent publications, Vascular Plants of Montana (1984), and Vascular Plants of Wyoming (1988). These are: Yellow Willow (*S. lutea*) and One Colored Willow (*S. monochroma*) for the *S. eriocephala* group, and Streambank Willow (*S. exigua*) and Mountain Streambank Willow (*S. melanopsis*) for Dr. Brunsfeld's group.

If these people complete their work by the time our final technical bulletin comes out, we will probably adopt their products.



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